



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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TECHNICAL MEMORANDUM

DATE: May 6, 2021
TO: James Marsh, City of Lynn
FROM: Casey Claude, Boston Region Metropolitan Planning Organization Staff
RE: Locations with High Bicycle and Pedestrian Crash Rates in the Boston Region Metropolitan Planning Organization (MPO) Area: Liberty Street and Washington Street in Lynn

This memorandum summarizes the analyses and improvement strategies for the intersection of Liberty Street and Washington Street in Lynn.

This memorandum contains the following sections:

1. [Study Background](#)
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It also includes technical appendices that contain data and methods applied in the study.

1 STUDY BACKGROUND

The purpose of the *Locations with High Bicycle and Pedestrian Crash Rates in the Boston Region MPO Area* study is to examine safety, mobility, and comfort issues for bicycle and pedestrian travel at intersections in the Boston region. The intent of the study is twofold: (1) study high-crash locations to understand what is contributing to the danger of walking and bicycling at selected intersections, and (2) identify features of the physical environment in need of improvement for the safety and comfort of pedestrian and bicycle travel. This work gives the communities in which the intersections are located the opportunity to look at the needs of the studied intersections, starting at the conceptual level, before the municipality commits funds for design and engineering. Eventually, if the project qualifies for federal funds, the study's documentation also is useful to the

Civil Rights, nondiscrimination, and accessibility information is on the last page.

Massachusetts Department of Transportation (MassDOT). This study supports the MPO's visions and goals, which include increasing transportation safety, maintaining the transportation system, advancing mobility, and reducing vehicle emissions.

Following a selection process based on bicycle and pedestrian crash information, equity considerations, and implementation potential, the following three locations were chosen for study:

1. Liberty Street and Washington Street in Lynn
2. Main Street and Centre Street in Malden
3. Everett Avenue and Chestnut Street in Chelsea

The location in Lynn was selected because the intersection at Liberty Street and Washington Street is located within Highway Safety Improvement Program (HSIP) crash clusters for both bicyclists and pedestrians.¹ The intersection also is located within a transportation analysis zone (TAZ) that exceeds the regional thresholds for minority and low-income populations.²

MPO staff discussed safety and operations issues at the intersection and the scope of work for the study with staff of the City of Lynn, who expressed interest and willingness to participate in the study. The intersection is heavily used as a connection in downtown Lynn from Market Street to Essex Street. Safe bicycle and pedestrian facilities at the intersection are particularly important due to the location's proximity to the YMCA, Saint Mary's High School, and a proposed shared-use path that would connect the terminus of the planned Northern Strand Community Path at 756 Western Avenue to the Lynn Shore and Nahant Beach Reservation.

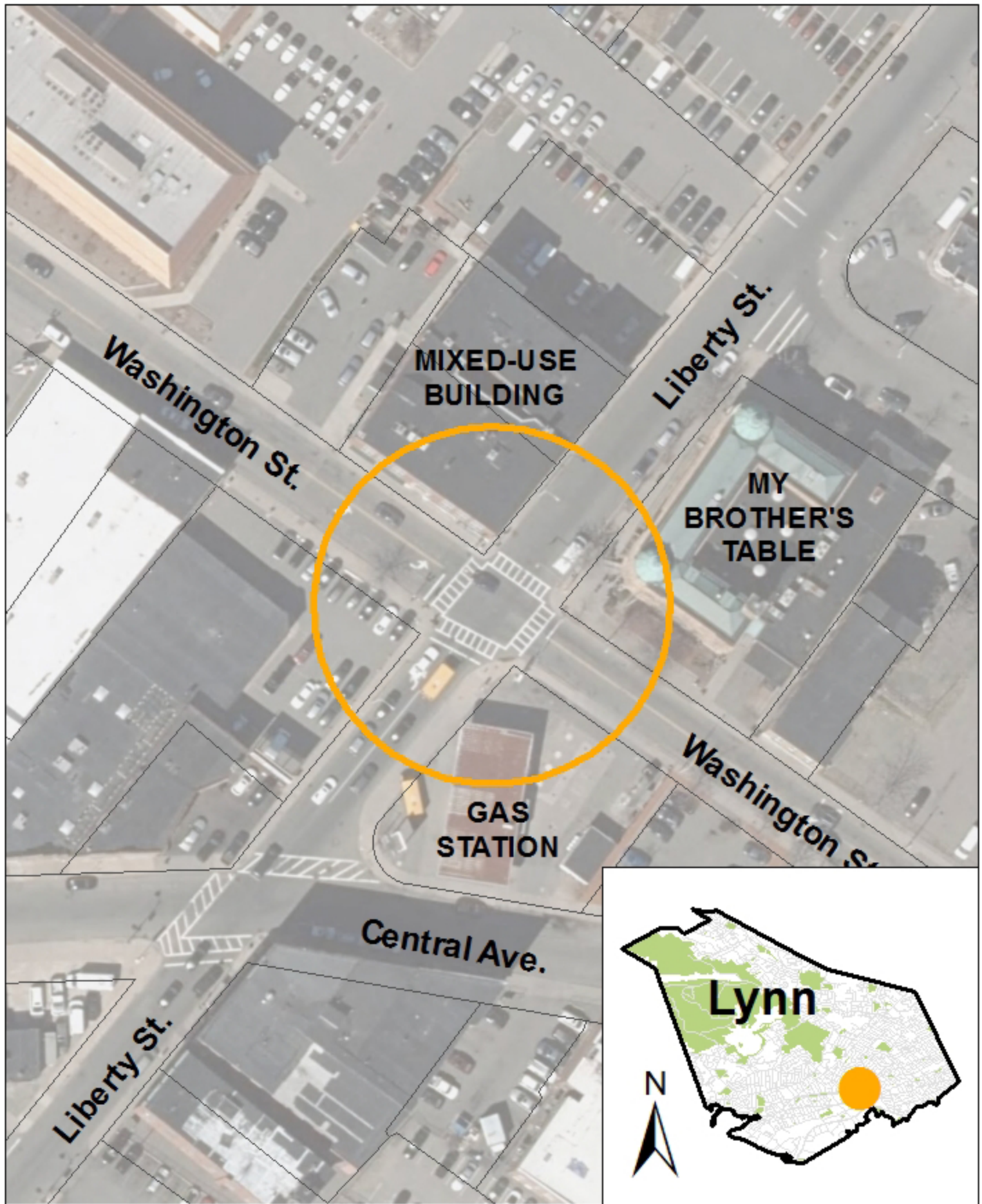
The Northern Strand Community Path will split into two separate trails at the Western Avenue terminus. While the Community Path of Lynn will connect Western Avenue to Bennett Street by continuing along the abandoned trail bed

¹ An HSIP eligible cluster is one in which the total number of Equivalent Property Damage Only (EPDO) crashes is within the top five percent in the region. EPDO is a method of combining the number of crashes with the severity of crashes based on a weighted scale. Prior to 2016 the weighting factors used were as follows: a fatal crash was worth 10 points, an injury crash was worth five points, and a property-damage only crash was worth one point. Starting in 2016, the weighting factors were updated so that fatal and injury crashes are worth 21 and a property-damage only crash is worth one point. An HSIP eligible pedestrian crash cluster has an EPDO within the top five percent of all pedestrian crash clusters in the region.

² A TAZ is the unit of geography most commonly used in conventional transportation planning models for tabulating transportation-related data. A TAZ usually consists of one or more census blocks, block groups, or census tracts. A map of the Boston region's TAZs can be found at <https://www.ctps.org/node/3122>.

that runs beside South Street, a separated on-road bicycle lane will travel down South Common Street into downtown Lynn along Market Street. Liberty Street intersects Market Street, so providing safe and comfortable bicycle accommodations along the roadway would expand Lynn's bicycle network.

The City of Lynn recognizes the need to improve the intersection to ensure safe and comfortable travel for all users. Figure 1 shows the location of the intersection and the surrounding roadways.



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FIGURE 1
Intersection Study Area
Liberty Street and Washington Street

*Locations with High Bicycle and
Pedestrian Crash Rates in the
Boston Region MPO Area*

2 EXISTING CONDITIONS

The intersection of Washington Street and Liberty Street is a four-legged, signalized intersection that is actuated with inductive loop detection.³ There are three approaches to the intersection. Liberty Street is a northbound, one-way road with a two-lane approach that includes a through/right lane and a left/through lane. Washington Street eastbound and westbound make up the intersection’s other two approaches. Washington Street eastbound has a two-lane approach with a through lane and a Left Turn Only lane, while westbound is a single-lane approach with a right/through lane.

Off the southern corner of the intersection is a Speedway gas station. On the eastern side of the intersection is My Brother’s Table, the largest soup kitchen on the North Shore (Figure 2). The north of the intersection is anchored by a mixed-use building that includes a convenience store, the Lynn Shelter Association, and a Dominican restaurant (Figure 3). Directly west of the intersection are parking lots that serve offices and an auto repair shop along Central Street (Figure 4).

Figure 2
My Brother’s Table on East Corner of the Intersection of Liberty and Washington Streets



³ City of Lynn, “Citywide Traffic Signal Inventory: Evaluations and Recommendations Report” (Prepared by WorldTech Engineering, LLC., April 2020), 205.

Figure 3
Mixed-Use Building on North Corner of the Intersection of Liberty and Washington Streets



Figure 4
Parking Lot on Liberty Street on West Corner of the Intersection of Liberty and Washington Streets



There are wide curb cuts present along both sides of Liberty Street to accommodate entering and exiting vehicles (Figure 5). On the west side of the roadway, the curb cuts serve the parking lots for the offices at 115-133 Central Avenue and the auto repair shop at 101 Central Avenue. On the east side of the roadway, the curb cuts serve the Speedway gas station on the south corner of the intersection (Figure 6), for which there are also curb cuts included on the southern side of Washington Street's westbound approach.

Figure 5
Wide Curb Cuts on Liberty Street Intersection Approach



Figure 6
Speedway Gas Station on South Corner of the Intersection of Liberty and Washington Streets



Sidewalks run along both sides of every approach to the intersection, all exceeding the American with Disabilities Act (ADA) minimum width of five feet. Fading ladder-style crosswalks mark each crossing with solid white lines between two parallel solid white lines. Apex curb ramps are located at each of the intersection’s four corners. There are no bicycle facilities along either roadway, although a wave bicycle rack is installed outside My Brother’s Table on the northern side of Washington Street’s westbound intersection approach (Figure 7).

Figure 7
Wave Bicycle Rack Installed at My Brother’s Table on Washington Street



The intersection's exclusive pedestrian phase is push-button actuated. There are two one-section pedestrian signal heads at each corner. The signals on the eastern, southern, and western corners feature a nine-inch LED symbol display. The pedestrian signals on the northern corner feature a 12-inch LED symbol display and include countdown displays for the pedestrian Flashing Don't Walk phase.

Within the vicinity of the study intersection, there are bus stops for MBTA bus Route 435. Route 435 buses travel outbound along Washington Street, with the nearest stop to the study intersection located at Washington Street and Essex Street, one block west of the intersection. Inbound buses on Route 435 travel along both Washington Street and Liberty Street, turning left up Liberty Street at the study intersection. The two nearest Route 435 bus stops along the inbound route are at Washington Street and Essex Street and at Liberty Street and Barker Court, approximately one block north of the intersection.

None of the intersection approaches feature on-street parking. North of the intersection, beside My Brother's Table, there is signage for two-hour parking on the east side of Liberty Street.

Central Street meets Liberty Street just southwest of the Washington Street intersection under study. Central Street is an eastbound, one-way road with a one-lane approach and, on the block prior to Liberty Street, on-street parking on its north side. The intersection is non-signalized and skewed such that left turns onto Liberty Street are wide, with an acute angle view of oncoming traffic to the right. A mid-block crosswalk approximately 170 feet southeast of the intersection facilitates pedestrian travel across Washington Street.

The width of Liberty Street exceeds 26 feet from Sutton Street to beyond Willow Street, but is only striped for two lanes of motor vehicle traffic from Central Avenue to Washington Street. The width of Liberty Street exceeds 24 feet from Market Street to Sutton Street.

Street signage along Liberty Street from Market Street to Willow Street indicates that parking is not allowed on the northwest side of the roadway, aside from outside of Rossetti Restaurant, located at Liberty Street's intersection with Sutton Street, where one-hour parking is permitted.

On the southeast side of Liberty Street, parking is not allowed near Market Street, but the area is a loading zone. Paid street parking is available on Liberty Street's southeast side from Sutton Street to Central Avenue. Parking on Liberty

Street's southeast side is allowed for two hours between Washington Street and Willow Street.

MPO staff observed more vehicles turning into the Speedway parking lot than the Central Avenue parking lots, which suggests that the northwest side of Liberty Street is safer for bicycle travel than the southeast side of the roadway.

3 ISSUES AND CONCERNS

The biggest concern at the Liberty Street and Washington Street intersection is that it is located within HSIP crash clusters for both bicyclists and pedestrians. As previously explained, there are no bicycle facilities along either roadway. While there are pedestrian accommodations, such as sidewalks and pedestrian signals at the intersection, there are several elements in need of improvement.

Although there are curb ramps at all four corners of the Liberty Street and Washington Street intersection, they are all apex ramps, which direct users into the middle of the intersection.

All four curb ramps lack detectable warnings with truncated domes, which is an ADA requirement to help users with disabilities distinguish between the safety of the sidewalk and the danger of the roadway.

MPO staff observed several pedestrians crossing Washington Street southeast of Liberty Street, between the intersection and the mid-block crosswalk less than a block away.

The pedestrian signal push buttons at each corner are not Accessible Pedestrian Signals (APS), meaning they do not include a tactile or audible component to communicate to hearing- or vision-impaired users that it is safe to cross the intersection.

Two of the Liberty Street and Washington Street intersection's pedestrian signals are not facing the proper direction. Both Washington Street crossings for southward travel along Liberty Street have a pedestrian signal facing east instead of north. Figures 8 and 9 below illustrate these conditions.

Figure 8
Pedestrian Signals on Western Corner of the Intersection of Liberty and
Washington Streets



Figure 9
Pedestrian Signals on Southern Corner of the Intersection of Liberty and Washington Streets



The non-signalized intersection of Liberty Street and Central Street to the southwest of the study intersection presents concerns related to driver behavior during peak hours. Field observations suggest that the elevated volume of vehicles on both Liberty Street and Central Street during peak travel times leads motorists on Central Street to suddenly and quickly cross or turn onto Liberty Street when they perceive an opening in traffic. When the focus of drivers' attention is directed to finding gaps in vehicle traffic, the opportunity for pedestrian or bicyclist conflicts with motorists increases because other road users become a secondary consideration for drivers when they are trying to gauge Liberty Street traffic.

Figure 10
View along Liberty Street with Central Street Approach on Left



The number of driveways and parking lots in the study area is a notable safety concern. Both sides of the Liberty Street approach along the southwest leg of the intersection have many points for conflict because vehicles cross the sidewalk to access the parking lots and the Speedway gas station. Another entrance to the gas station is on Washington Street on the southeastern leg of the intersection, which introduces conflict potential along the sidewalk on the southwestern side of the street.

4 BICYCLE AND PEDESTRIAN TRAVEL

On July 29, 2020, MPO staff counted 92 pedestrians and 15 bicyclists during one hour of peak travel. Staff observed pedestrians in the roadway along Washington Street's southeastern approach to the intersection and along Liberty Street northeast of the intersection. Many bicyclists observed at the intersection were traveling along the sidewalks.

MPO staff graded the intersection of Liberty Street and Washington Street in Lynn using the Boston Region MPO's Pedestrian Report Card Assessment (PRCA)⁴ and Bicycle Report Card⁵ tools to assess the safety and comfort of the area for people walking and bicycling. The grading categories reflect the MPO's Long Range Transportation Plan (LRTP) goals and assess the quality of four different aspects of the environment associated with these goal areas: Capacity

⁴ Boston Region Metropolitan Planning Organization, "Pedestrian Level-of-Service" (Prepared by Ryan Hicks and Casey-Marie Claude, January 2017). <https://www.ctps.org/ped-report-card>. [Updated in 2019: Boston Region Metropolitan Planning Organization, "Pedestrian Report Card Assessment Interactive Database" (Prepared by Casey-Marie Claude, November 2019). https://www.ctps.org/data/pdf/programs/bike_ped/prca_app/2019-11-21_PRCA_Interactive_Database.pdf.]

⁵ Boston Region Metropolitan Planning Organization, "Development of a Scoring System for Bicycle Travel in the Boston Region" (Prepared by Casey-Marie Claude, November 2018). <https://www.ctps.org/bicycle-level-of-service>.

Management and Mobility, Economic Vitality, Safety, and System Preservation. The report cards also prioritize locations based on Transportation Equity factors, incorporating another Boston region LRTP goal.

Figure 11
Non-Signalized Intersection PRCA for Liberty Street and Washington Street

Pedestrian Report Card Assessment (PRCA) Signalized Intersection

Capacity Management and Mobility			
Performance Measure ^[1]	Percentage	Score (out of 3.0)	Rating
Pedestrian Delay	43%	2	Fair
Sidewalk Presence	29%	3	Good
Curb Ramp Presence	14%	1	Poor
Crosswalk Presence	14%	3	Good
GRADING CATEGORY TOTAL^[2] <small>(Pedestrian Delay Score * 0.43) + (Sidewalk Presence Score * 0.29) + (Curb Ramp Presence Score * 0.14) + (Crosswalk Presence Score * 0.14)</small>	100%	2.29	Fair

Economic Vitality			
Performance Measure ^[1]	Percentage	Score (out of 3.0)	Rating
Pedestrian Volumes	100%	3	Good

[1] Poor = 1.0; Fair = 2.0; Good = 3.0

[2] Poor = 0 to 1.7; Fair = 1.7 < 2.3; Good = 2.3 to 3.0

[3] Use these factors to determine Transportation Equity priority level (front)

Safety			
Performance Measure ^[1]	Percentage	Score (out of 3.0)	Rating
Sufficient Crossing Time (Index)	38%	3	Good
Pedestrian Crashes	38%	0	Dangerous
Pedestrian Signal Phase Type	13%	2	Fair
Vehicle Travel Speed	13%	3	Good
GRADING CATEGORY TOTAL^[2] <small>(Sufficient Crossing Time Index Score * 0.38) + (Pedestrian Crashes Score * 0.38) + (Pedestrian Signal Phase Type Score * 0.13) + (Vehicle Travel Speed Score * 0.13)</small>	100%	1.79	Fair

System Preservation			
Performance Measure ^[1]	Percentage	Score (out of 3.0)	Rating
Sidewalk Condition	100%	2	Fair

Transportation Equity Priority ^[3]	
Area Condition	Yes/No
Low-Income Population ≥ 32.32%	Yes
Minority Population ≥ 28.19%	Yes
More than 6.69% of Population > 75 Years of Age	Yes
More than 16.15% of Households w/o Vehicle	Yes
Within ¼ Mile of School/College	Yes

The intersection received a “Fair” score for Capacity Management and Mobility. The lack of paired curb ramps and the complete absence of detectable warnings featuring truncated domes lowered the category score, while the presence of marked crosswalks across every leg and sufficiently wide sidewalks along both sides of the two roadways improved the overall grade. The current pedestrian delay, which is the amount of time a pedestrian waits in the signal cycle for the pedestrian crossing phase, of approximately 31 seconds is decent but could be improved.

The intersection scored well for pedestrians in the Economic Vitality category because many pedestrians travel through the location.

The intersection of Liberty Street and Washington Street earned a “fair” Safety score in spite of its location in an HSIP-eligible crash cluster for three reasons. The first is that the pedestrian crossing phase is exclusive, which is helpful because it separates pedestrians crossing the intersection from vehicle traffic. However, exclusive signals often result in increased pedestrian delay due to the lack of frequency of the pedestrian phase within the signal cycle. Therefore, the intersection earned a “fair” rating for the Pedestrian Signal Phase Type metric. The intersection earned a “good” grade for the amount of time provided for pedestrians to cross the intersection because it allows pedestrians to travel at a speed of 2.39 feet per second, which is approximately 68 percent of the Federal Highway Administration (FHWA) maximum crossing speed of 3.5 feet per second. This guidance aims to provide sufficient time for all users to complete an intersection crossing. Vehicle travel speed is considered “good” at the intersection of Liberty Street and Washington Street because the average does not exceed 25 miles per hour.

Sidewalk condition is “fair” at the location because many segments of concrete are cracked and in need of repair, but the sidewalks themselves are of sufficient width and located on both sides of all four intersection legs. Finally, the intersection is considered a high priority area for pedestrian transportation equity because the proportions of all four populations of concern (low income, minority, elderly, and zero vehicle households) at the location exceed their regional averages and the intersection is located within a quarter mile of a school.

Figure 12
Bicycle Report Card for Liberty Street and Washington Street

Bicycle Report Card
Scoring Breakdown

Capacity Management and Mobility			
Performance Measure	Percentage	Points	Grade
Bicycle Facility Presence	50%	0	F
Proximity to Bike Network	33%	0	F
Proximity to Transit	17%	100	A
Total	100%	17	F

Economic Vitality			
Performance Measure	Percentage	Points	Grade
Bike Rack Presence	50%	90	A
Land Use	50%	100	A
Total	100%	95	A

Grading
A: 90–100 *Excellent*
B: 80–89 *Satisfactory*
C: 70–79 *Acceptable*
D: 60–69 *Needs Improvement*
F: 59–0 *Not recommended for bicycle travel*

Transportation Equity Priority
High: Four (4) or Five (5) Factors
Moderate: Two (2) or Three (3) Factors
Low: Zero (0) or One (1) Factor

Safety			
Performance Measure	Percentage	Points	Grade
Bicycle Facility Presence	33%	0	F
Absence of Bicycle Crashes	33%	0	F
Bicyclist Operating Space	17%	0	F
Number of Travel Lanes	17%	75	C
Total	100%	12.75	F

System Preservation			
Performance Measure	Percentage	Points	Grade
Bicycle Facility Continuity	50%	0	F
Bicycle Facility Condition	50%	0	F
Total	100%	0	F

Transportation Equity Priority	
Area Condition	Yes/No
Low Income Population \geq 32.32%	Yes
Minority Population \geq 28.19%	Yes
18.2%+ of Population < 16 Years Old	Yes
16.15%+ of Households w/o Vehicle	Yes
Within ¼ Mile of School/College	Yes

The intersection of Liberty Street and Washington Street received a failing score for three out of four Bicycle Report Card grading categories. The lack of bicycle facilities played a large factor in the ratings. In the Capacity Management and Mobility category, this absence—combined with the lack of bicycle facilities within a quarter mile of the location—outweighed the fact that the Route 435 bus stop is one block away from the study location, much closer than the half mile Proximity to Transit metric.

In the Economic Vitality category, however, the presence of sub-par bike racks had value in supporting access to the businesses and services at this intersection with its diverse land uses, which create many origins and destinations for bicyclists within the study area.

Although the southeast side of Washington Street only includes one lane of traffic per direction of travel, Washington Street’s southeast-bound approach features

two lanes of travel in one direction and both sides of Liberty Street include two one-way lanes for motorists. This allowed the intersection to barely pass the Number of Travel Lanes performance metric, but the intersection failed the remaining three metrics included in the Safety category of the Bicycle Report Card. The lack of bicycle facilities at the intersection, the associated absence of bicyclist operating space along both roadways, and the fact that Chestnut Street meets Everett Avenue within an HSIP-eligible bicycle crash cluster all contribute to the location's failing Safety score.

Without bicycle facilities at the location, it was impossible for either roadway to earn points for bicycle System Preservation, which led to another failing grade. Finally, the intersection is considered a high priority area for pedestrian transportation equity because the proportions of all four populations of concern (low income, minority, youth, and zero vehicle households) at the location exceed their regional averages and the intersection is located within a quarter mile of a school.

5 CRASH DATA ANALYSIS

5.1 Collision Trends

Forty crashes were recorded over the five-year period between 2013 and 2017. Table 1 breaks these crashes down by the type of collision, severity, and factors that may have influenced the crash. Eight crashes involved pedestrians and one involved a bicyclist. The majority of the pedestrian and bicycle crashes occurred under dry conditions during off-peak travel hours.

Table 1
2013–17 Crash Summary Table

Crash Variable	Number of Total Crashes	Number of Vehicle Only Crashes	Number of Pedestrian-Involved Crashes	Number of Bicyclist-Involved Crashes
<i>Crash Severity</i>				
Non-fatal injury	15	8	7	0
Property damage only	22	20	1	1
Not reported	3	3	0	0
Total crashes	40	31	8	1
<i>Manner of Collision</i>				
Angle	13	11	2	0
Rear-end	10	10	0	0
Sideswipe, opposite direction	1	1	0	0
Sideswipe, same direction	5	4	1	0
Head-on	1	1	0	0
Single vehicle crash	7	1	5	1
Not reported/unknown	3	3	0	0
Total Crashes	40	31	8	1
<i>Road Surface Condition</i>				
Dry	29	22	6	1
Snow	2	2	0	0
Wet	8	6	2	0
Not reported	1	1	0	0
Total Crashes	40	31	8	1
<i>Ambient Light Condition</i>				
Dawn	1	0	1	0
Daylight	22	17	4	1
Dusk	4	3	1	0
Dark - lighted roadway	13	11	2	0
Total Crashes	40	31	8	1
<i>Weather Condition</i>				
Clear	25	20	4	1
Wind/severe crosswind	1	1	0	0
Cloudy	5	3	2	0
Rain	5	3	2	0
Sleet	2	2	0	0
Snow	2	2	0	0
Total Crashes	40	31	8	1
<i>Travel Period</i>				
Peak AM	9	6	2	1

Peak PM	4	3	1	0
Off-peak	27	22	5	0
Total Crashes	40	31	8	1
Five-Year Average	8	6.2	1.6	0.2

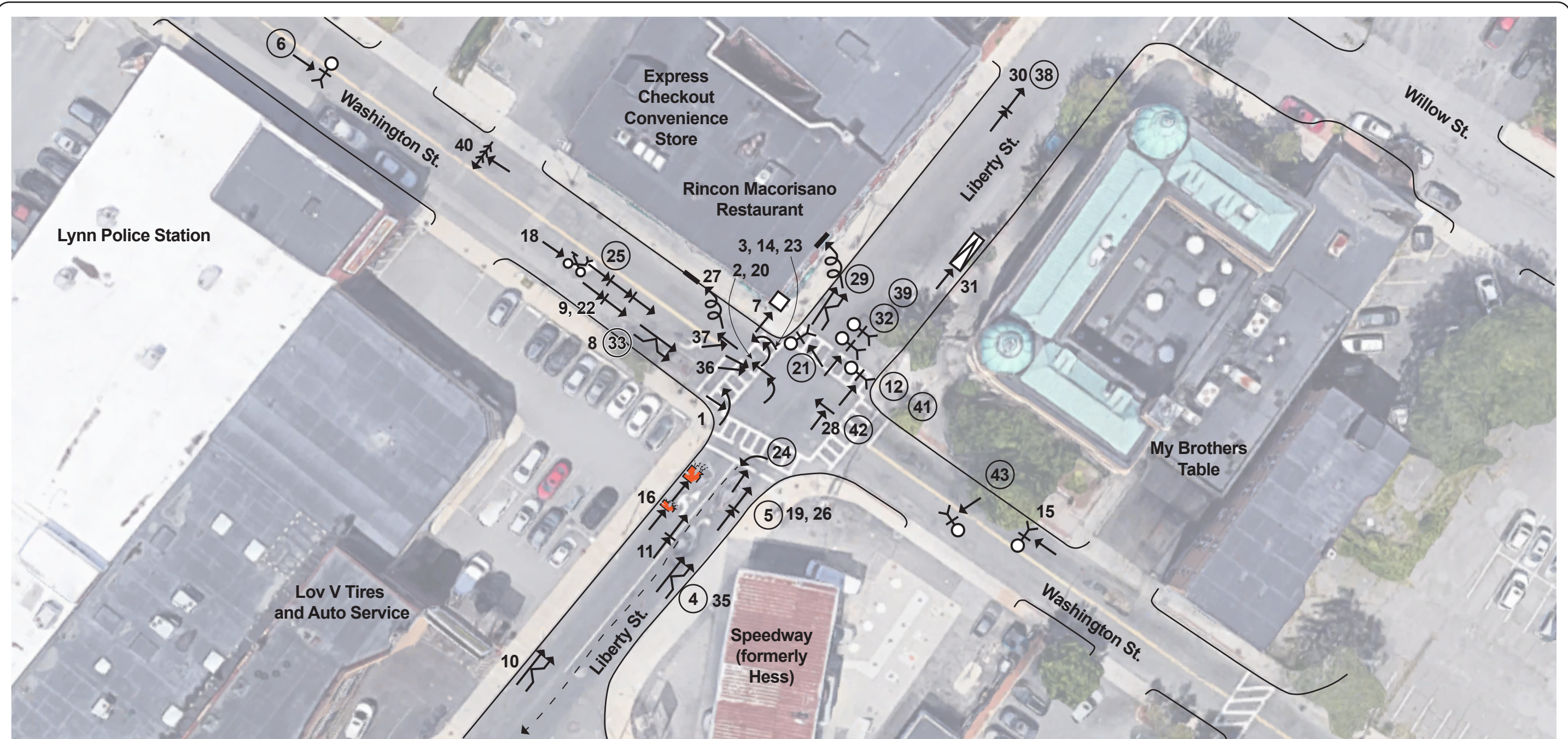
* Peak periods are defined as 6:00–9:00 AM and 3:00–6:00 PM

Some highlights from the data include the following:

- 13 crashes (33 percent) were angle collisions
- 10 crashes (25 percent) were rear-end collisions

5.2 Collision Diagram

MPO staff also prepared a collision diagram for the study intersection to examine crash patterns. Police reports were obtained for the years 2013–17. Figure 11 shows the collision diagram. The index numbers in the collision diagram may be used to cross-reference the crash records in Appendix B. The index numbers with circles around them refer to crashes that resulted in injury or fatality, and the severity is depicted by the thickness of the circle line.



SYMBOLS

- | | |
|---------------------------------|------------------------------|
| → Moving Vehicle | → [trapezoid] Parked Vehicle |
| ←←← Backing Vehicle | → [square] Fixed Object |
| - - - Non-Involved Vehicle | → [bicycle] Bicycle |
| → [stick figure] Pedestrian | → [animal] Animal |
| → [flaming car] Airborne Debris | |

TYPES OF CRASH

- | | |
|--------------|--------------------|
| → → Head On | → → Sideswipe |
| → ↘ Angle | → → Out of Control |
| → → Rear End | |

SEVERITY

- | | |
|-------------------|------------------|
| ○ Injury Accident | ○ Fatal Accident |
|-------------------|------------------|

FIGURE 13
Collision Diagram: MassDOT Crash Data 2013-17
Liberty Street and Washington Street Intersection in Lynn



5.3 Safety Analysis

After analyzing the collision data, MPO staff concluded that crashes within the study area primarily appear to be caused by confusion and lack of visibility. Every pedestrian-involved crash for which police identified the location of the non-motorist at the time of the crash included pedestrians who were entering or crossing a marked crosswalk at the intersection. This may be attributed to two key factors:

- Vehicle stop lines near the intersection make it more difficult to see pedestrians crossing the intersection than if vehicles stopped at a distance set farther back from the intersection.
- The ability for vehicles to turn right on red encourages drivers to search for opportunities to proceed through the intersection quickly, which may lead drivers to search for openings in vehicle traffic without noticing crossing pedestrians.

In the one bicycle-involved crash, the bicyclist was hit while crossing between traffic on Washington Street, just west of the intersection. This behavior, while ill-advised, speaks to the lack of bicycle accommodations at the intersection of Washington Street and Liberty Street.

6 IMPROVEMENT RECOMMENDATIONS

One improvement that would help all users is narrowing the curb cuts for driveways within the study area. Creating intentional, designated entrances and exits to parking lots that only allow one vehicle to enter or exit at a time will help reduce vehicle turning speeds, increase motorist awareness of all users traveling along the roadway, and improve visibility for all modes by reducing the number of vehicles along the sidewalk and curb entering or exiting at any one location.

Another improvement that would help all users at the intersection is adjusting the clearance time at the signal for vehicles and pedestrians. For through and right-turning motorists, with Lynn's statutory speed limit of 25 miles per hour in business districts and a 60-foot crossing distance at the intersection, the total clearance time should be rounded up to 4.5 seconds.⁶ This clearance time comprises 3.5 seconds for the yellow clearance phase and one second for the all-red clearance. During the exclusive left-turn phase on Washington Street for motorists at the northwest intersection approach, the total clearance time should be rounded up to 5.0 seconds. This clearance time comprises 2.5 seconds for the yellow clearance phase and 2.5 seconds for the all-red clearance.

⁶ Massachusetts Department of Transportation, "Speed Limits in Thickly Settled or Business Districts", 2021. <https://www.mass.gov/info-details/speed-limits-in-thickly-settled-or-business-districts#municipalities-that-have-notified-massdot-of-opt-in->.

The minimum timing for the exclusive pedestrian phase at the Liberty Street and Washington Street intersection is a seven-second walk interval and a 10-second pedestrian clearance interval, for a total pedestrian phase duration of 17 seconds. This timing is based upon a pedestrian walking speed of 3.5 feet per second to cross Washington Street's 35-foot width, and may be increased to accommodate pedestrians with slower walking speeds. Additionally, a red clearance phase with a duration between one and three seconds helps to facilitate safe pedestrian crossings.

If concurrent pedestrian signal phases are added to the intersection of Liberty Street and Washington Street, the seven-second walk phase should begin as a Leading Pedestrian Interval (LPI). The clearance time should again be 10 seconds, whether pedestrians are crossing Liberty Street or Washington Street, for a total pedestrian phase duration of 17 seconds for both concurrent pedestrian phases. Tables showing the yellow change, red clearance, and pedestrian interval calculations are included in Appendix C.

It would also be helpful for all modes at the intersection if Lynn were to install vehicle detection, which would reduce delays for both vehicles and pedestrians.

The following pedestrian improvements are recommended:

- Replace apex curb ramps with paired curb ramps, so that there are separate curb ramps and landings for each entry to the crosswalks.
 - “Paired curb ramps on a corner allow better alignment for people using mobility aids and for pedestrians with vision impairments and make it easier to separate the APS [accessible pedestrian signal].”
 - “Paired curb ramps allow pedestrians with disabilities to be aligned with the crossing direction while waiting to cross the street.”
 - “Paired curb ramps help meet the separation requirements for APS.”⁷
- Add pedestrian detectable warnings with truncated domes to each curb ramp.
- Move stop lines farther back from the intersection for all three approaches to improve visibility for motorists and allow them to better see pedestrians.
- Add No Turn on Red signage to the Liberty Street and Washington Street westbound approaches.

⁷ Otak, Inc., “Accessible Public Rights-of-Way: Planning and Designing for Alterations; Chapter 6—Curb Ramp Examples” United States Access Board, August 2007. <https://www.access-board.gov/provag/planning-and-design-for-alterations/chapter6/>.

- Turn the two pedestrian signals incorrectly facing east along Washington Street to the direction in which they should facing—north along Liberty Street.
- Upgrade all pedestrian signals at the intersection to accessible pedestrian signals (APS).
- Upgrade the pedestrian signals without countdown timer displays to include the countdown information.
- Study signal retiming to determine whether pedestrian delay at the intersection can be minimized without causing unreasonable impacts to traffic flow in the area.
- Add a Pedestrian Warning sign (W11-2) to both sides of Washington Street ahead of the mid-block crosswalk, which is located approximately 170 feet southeast of the intersection. The signs may also be accompanied by diagonal downward pointing arrows (W16-7P). Yield lines with Yield Here to Pedestrians signs (R1-5 or R1-5a) should be installed 20 to 50 feet in advance of the crosswalk.

The following bicycle improvements are recommended:

- Add bicycle racks to the intersection and nearby locations. Refer to the Association of Pedestrian and Bicycle Professionals (APBP) bike parking guidebook for recommendations and rationale.⁸
- Test separated bicycle facilities on the northwest side of Liberty Street, from Market Street to Willow Street. This will expand Lynn’s bicycle network by connecting to the Northern Strand Community Path’s separated bicycle lane on Market Street.
 - At intersection crossings, use green paint to draw drivers’ awareness to the bicycle lane running along Liberty Street. This would be at the Sutton Street, Central Avenue, and Washington Street intersections.
 - Consider redesigning Liberty Street from Central Avenue to Washington Street by narrowing the two vehicle travel lanes to 10-foot widths and adding both a five-foot wide bicycle lane and a buffer approximately two-feet wide to separate the modes.
 - Consider redesigning Liberty Street from Sutton Street to Central Avenue and from Washington Street to Willow Street to allow for one 10-foot wide vehicle travel lane, a seven-foot wide parking lane, a six-foot wide bicycle lane, and a buffer approximately three-feet wide.

⁸ Association of Pedestrian and Bicycle Professionals (APBP), “Essentials of Bike Parking: Selecting and Installing Bike Parking that Works” (Prepared by Alta, September 2015). https://www.apbp.org/assets/docs/EssentialsofBikeParking_FINA.pdf.

- Consider redesigning Liberty Street from Market Street to Sutton Street to allow for one 10-foot wide vehicle travel lane, a seven-foot wide parking lane, a five-foot wide bicycle lane, and a buffer approximately two-feet wide.
- Add bicycle detection to signals for all intersection approaches.

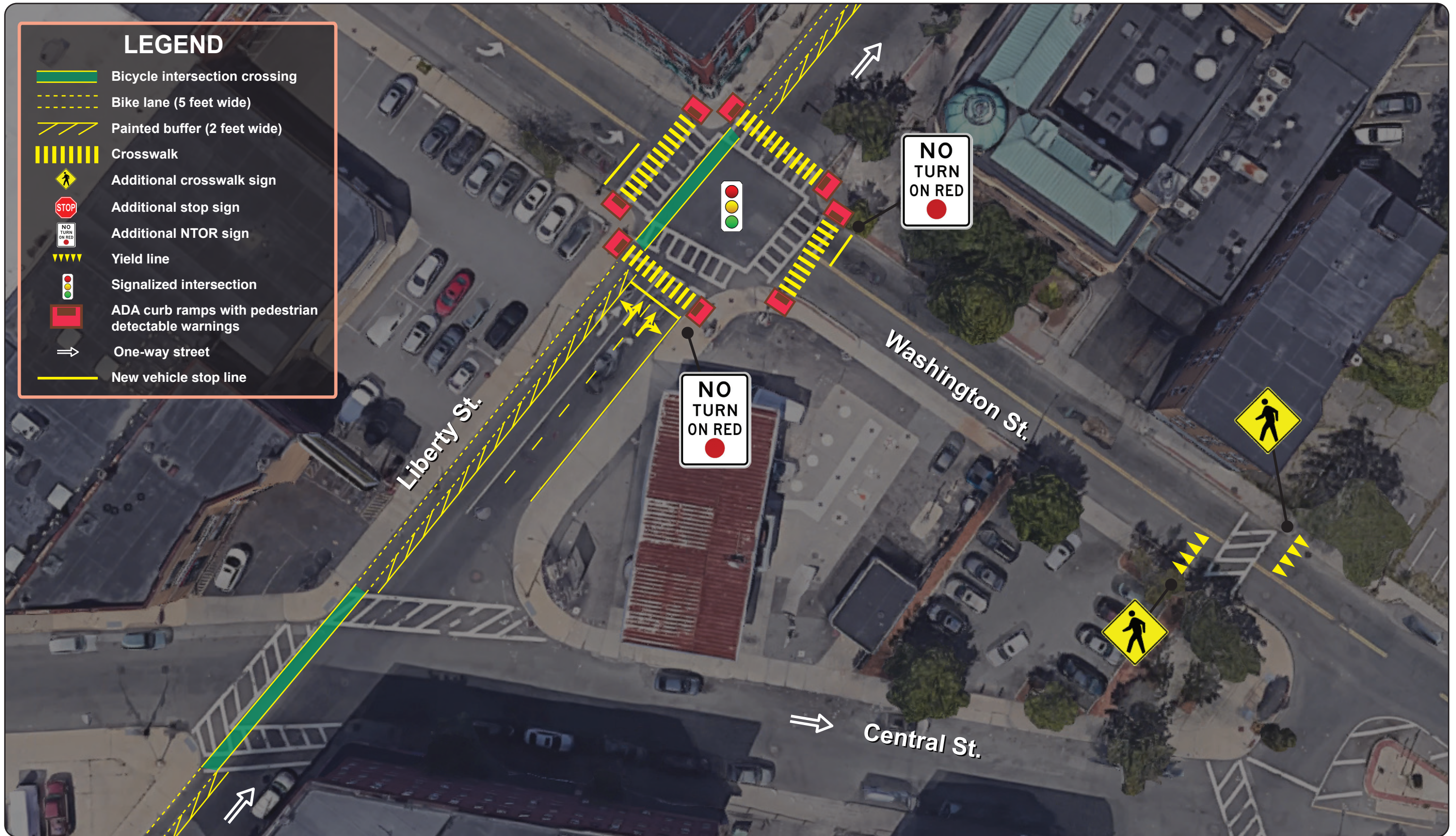


FIGURE 14
Proposed Improvements Conceptual Plan
Liberty Street and Washington Street in Lynn

7 CONCLUSIONS AND NEXT STEPS

7.1 Conclusions

The above evaluations and recommendations support the need for improvements that would enhance bicycle and pedestrian safety and comfort at the intersection of Liberty Street and Washington Street in Lynn. The suggestions address concerns related to crashes involving people walking or bicycling. Although MPO staff were not able to analyze traffic volumes and assess travel patterns due to the COVID-19 pandemic, this memorandum presents several approaches that the City of Lynn could take to improve the quality of the pedestrian and bicyclist environment at this intersection without severely impacting other modes of travel.

7.2 Next Steps

As traffic patterns return to their previous levels over the coming months and years, the City of Lynn should consider documenting the motorists, bicyclists, pedestrians, and other users who regularly travel through the intersection of Liberty Street and Washington Street. Traffic counts should be used to evaluate signal timing at the intersection in order to determine the impact on traffic flow of retiming the signals to shorten pedestrian delay, perhaps by establishing a concurrent pedestrian signal phase with LPIs. Additionally, a better understanding of travel volumes by mode and turning movements would be helpful for completing applications for regional, state, and federal funding to support infrastructure improvements. If future assessments of the intersection determine that the location would benefit from geometric reconfiguration or the installation of new infrastructure for bicycle and pedestrian safety, the City of Lynn may consider applying for Transportation Improvement Program (TIP) funding through the Boston Region MPO.

Appendices

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

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Appendix A

Selection of High Bicycle and Pedestrian Crash Rate Intersections

APPENDIX A

Selection of High Bicycle and Pedestrian Crash Rate Intersections

1 BACKGROUND

This memorandum presents the results of Task 1 (Select Study Locations) of the Work Program for the Locations with High Bicycle and Pedestrian Crash Rates in the Boston Region MPO Area project.

The purpose of the Locations with High Bicycle and Pedestrian Crash Rates in the Boston Region MPO Area study is to examine safety, mobility, and comfort issues for bicycle and pedestrian travel at intersections in the Boston MPO region. The intent of the study is twofold: (1) Study high-crash locations to understand what is contributing to the danger of walking and bicycling at selected intersections, and (2) identify features of the physical environment in need of improvement for the safety and comfort of pedestrian and bicycle travel. This study supports the MPO's visions and goals, which include increasing transportation safety, maintaining the transportation system, advancing mobility, and reducing vehicle emissions. This work also gives the communities in which the intersections are located the opportunity to look at the needs of the studied intersections, starting at the conceptual level, before the municipality commits funds for design and engineering. Eventually, if the project at a selected location qualifies for federal funds, the study documentation will be useful for the Massachusetts Department of Transportation (MassDOT).

2 SELECTION PROCEDURE

The process for selecting study locations consisted of the following steps:

1. Gather and analyze data for Boston region intersections located within Highway Safety Improvement Program (HSIP) eligible bicycle and pedestrian crash locations.¹

¹ An HSIP eligible cluster is one in which the total number of Equivalent Property Damage Only (EPDO) crashes is within the top five percent in the region. EPDO is a method of combining the number of crashes with the severity of crashes based on a weighted scale. Prior to 2016 the weighting factors used were as follows: a fatal crash was worth 10 points, an injury crash

2. Prioritize intersections by need for bicycle and pedestrian improvement.
3. Evaluate prioritized intersections for study suitability.
4. Communicate with municipalities to determine interest in analysis and need for assistance.

2.1 Generating Data and Identifying Potential Intersections

MPO staff identified 1,001 intersections in 30 municipalities in the Boston region through the following process.

1. MPO staff compiled all the HSIP-eligible pedestrian and bicycle crash clusters in the Boston region.
2. MPO staff identified every intersection located within the Boston region's HSIP-eligible pedestrian and bicycle crash clusters.
3. MPO staff determined the Equivalent Property Damage Only (EPDO) crash severity rating for every identified intersection.
4. MPO staff determined which intersections belong to Transportation Analysis Zones (TAZ) with minority or low-income populations that exceed the Boston MPO's regional thresholds.²

2.2 Prioritize Intersections

MPO staff developed an equation to identify the level of need for bicycle and pedestrian improvements at each of the 1,001 intersections identified. The equation uses the EPDO of each intersection, the HSIP-eligible bicycle crash cluster EPDO, and the HSIP-eligible pedestrian crash cluster EPDO. In addition, the equation elevates the need for improvements in TAZs where minority and low-income populations exceed the Boston MPO's regional thresholds.

An intersection receives a "1" for each of the following criteria if the statement is true:

- The intersection includes a TAZ with a minority population that exceeds the Boston MPO's regional threshold.

was worth 5 points, and a property-damage only crash was worth 1 point. Starting in 2016, the weighting factors were updated so that fatal and injury crashes are worth 21 and a property-damage only crash is worth 1. An HSIP eligible pedestrian crash cluster has an EPDO within the top five percent of all pedestrian crash clusters in the region.

² A TAZ is the unit of geography most commonly used in conventional transportation planning models for tabulating transportation-related data. A TAZ usually consists of one or more census blocks, block groups, or census tracts. A map of the Boston region's TAZs can be found at <https://www.ctps.org/node/3122>.

- The intersection includes a TAZ with a low-income population that exceeds the regional threshold.

If conditions at an intersection do not agree with one of the above statements, the location receives a “0” for the criterion.

The equation applied by MPO staff is as follows:

$$\text{(Exceeds MPO Minority Threshold + Exceeds MPO Low-Income Threshold)} \\ \times \\ \text{[Intersection EPDO x (HSIP Bike EPDO + HSIP Pedestrian EPDO)]}$$

Table 1 presents the information compiled for the 1,001 intersections and indicates the level of priority for bicycle and pedestrian improvements at each location.

2.3 Evaluate Prioritized Intersections for Study Suitability

MPO staff next considered whether planning work or improvement projects had recently been completed, were currently underway, or were already set to begin at the highest priority intersections. To avoid the duplication of work and provide the greatest benefit to the Boston region, MPO staff considered locations without existing improvement efforts.

2.4 Communicate with Municipalities

After identifying promising locations for bicycle and pedestrian improvements, MPO staff contacted the municipalities being considered for this study. In spite of evaluating locations for study suitability in step three, municipalities provided assistance by sharing existing planning and improvement efforts MPO staff had not found previously. MPO staff worked with municipalities to identify high-priority intersections—as calculated in step two—for which the MPO’s work would be beneficial.

3 SELECTED INTERSECTIONS FOR STUDY

Among the prioritized intersections, MPO staff selected three intersections for study: (1) Everett Avenue and Chestnut Street in Chelsea; (2) Liberty Street and Washington Street in Lynn; and (3) Main Street and Centre Street (Route 60) in Malden.

3.1 Everett Avenue and Chestnut Street in Chelsea

The location in Chelsea was selected because the intersection at Everett Avenue and Chestnut Street is located within HSIP crash clusters for both bicyclists and

pedestrians. The intersection is also located within a TAZ that exceeds the regional thresholds for minority and low-income populations.

MPO staff discussed safety and operations issues at the intersection and the scope of work for the study with the city of Chelsea, which expressed interest and willingness to participate in the study. The proximity of the location to the Route 1 ramp for the Tobin Bridge is perceived as contributing to high vehicle travel speeds along Everett Avenue within the vicinity of the study area. The intersection is a heavily used connection in downtown Chelsea by travelers of all modes.

Safe bicycle and pedestrian facilities at the intersection are particularly important because of the location's proximity to shops and restaurants on Broadway, schools, residential properties, and proposed bicycle facilities to improve the bicycle network in the area. A bus stop at the intersection of Third Street and Chestnut Street, to which the study intersection is connected, generates significant pedestrian travel in the area. The City of Chelsea recognizes the need to improve the intersection of Everett Avenue and Chestnut Street to ensure safe and comfortable travel for all users.

3.2 Liberty Street and Washington Street in Lynn

The location in Lynn was selected because the intersection at Liberty Street and Washington Street is located within HSIP crash clusters for both bicyclists and pedestrians. The intersection also is located within a TAZ that exceeds the regional thresholds for minority and low-income populations.

MPO staff discussed safety and operations issues at the intersection and the scope of work for the study with staff of the City of Lynn, who expressed interest and willingness to participate in the study. The intersection is heavily used as a connection in downtown Lynn from Market Street to Essex Street. Safe bicycle and pedestrian facilities at the intersection are particularly important due to the location's proximity to the YMCA, Saint Mary's High School, and a proposed shared-use path that would connect the terminus of the planned Northern Strand Community Path at 756 Western Avenue to the Lynn Shore and Nahant Beach Reservation.

The Northern Strand Community Path will split into two separate trails at the Western Avenue terminus. While the Community Path of Lynn will connect Western Avenue to Bennett Street by continuing along the abandoned trail bed that runs beside South Street, a separated on-road bicycle lane will travel down South Common Street into downtown Lynn along Market Street. Liberty Street intersects Market Street, so providing safe and comfortable bicycle

accommodations along the roadway would expand Lynn's bicycle network. The City of Lynn recognizes the need to improve the intersection to ensure safe and comfortable travel for all users.

3.3 Main Street and Centre Street in Malden

The location in Malden was selected because the intersection at Centre Street and Main Street is within a HSIP-eligible pedestrian crash cluster. Although it is the one intersection chosen for this study that isn't located within an HSIP-eligible bicycle crash cluster, the intersection is located within a TAZ that exceeds the regional thresholds for minority and low-income populations, making it a high-priority location for safe and comfortable walking and bicycling.

MPO staff discussed safety and operations issues at the intersection and the scope of work for the study with the City of Malden, which expressed interest and willingness to participate in the study. The intersection is a heavily used connection in downtown Malden and is at the center of a Complete Streets project that Malden planned to put out to bid in the fall of 2020. The purpose of this study is to provide recommendations that the city can incorporate into its Complete Streets design and pending improvements. It is important to note, however, that Centre Street is also state Route 60 and may be subject to state jurisdictional regulations.

Safe bicycle and pedestrian facilities at the intersection are particularly important because of the location's proximity to the Northern Strand Community Path, which meets Main Street less than one-tenth of a mile south of the study intersection. To the north of the intersection are restaurants, shops, and other businesses that are easily accessible by foot or bike. There are many destinations south of the intersection, including a Stop & Shop one block to the west of the location. Several bus routes pass through Centre Street and Main Street; less than one-half of a mile to the west of the intersection is Malden Center Station, which serves the Haverhill Commuter Rail Line, the Orange Line, and 13 bus lines. The City of Malden recognizes the need to improve the intersection to ensure safe and comfortable travel for all users.

4 SUMMARY

The intersections selected for study through the Locations with High Bicycle and Pedestrian Crash Rates in the Boston Region MPO Area project have the potential to benefit bicycle and pedestrian safety at locations in need of improvement. The selection approach combined regional analysis with selection criteria and collaborative communication with eligible municipalities about where MPO staff work could most improve conditions for bicyclists and pedestrians. By using both quantitative analysis and discussing the project with city staff familiar

with conditions at the proposed locations, MPO staff were able to identify three intersections in need of safety and comfort improvements for bicyclists and pedestrians where the MPO's evaluation could make a meaningful impact.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Broadway	Everett Avenue	Chelsea	470	100%	1	1	4074	171	3990300	100%
Albany Street	Massachusetts Avenue	Cambridge	291	62%	1	1	302	4706	2914656	73%
Memorial Drive Underpass	Massachusetts Avenue	Cambridge	285	61%	1	1	0	4706	2682420	67%
Laighton Street	Washington Street	Lynn	333	71%	1	1	3235	0	2154510	54%
Massachusetts Avenue	Vassar Street	Cambridge	198	42%	1	1	302	4706	1983168	50%
Broad Street	Washington Street	Lynn	269	57%	1	1	3235	0	1740430	44%
Washington Street	Beacon Hill Avenue	Lynn	264	56%	1	1	3235	0	1708080	43%
Western Avenue	Washington Street	Lynn	261	56%	1	1	3235	0	1688670	42%
Williams Street	Commandants Way	Chelsea	182	39%	1	1	4074	0	1482936	37%
Liberty Street	Washington Street	Lynn	201	43%	1	1	3235	304	1422678	36%
Massachusetts Avenue	Douglass Street	Cambridge	93	20%	1	1	1895	4706	1227786	31%
River Street	Franklin Street	Cambridge	93	20%	1	1	1895	4706	1227786	31%
Massachusetts Avenue	Main Street	Cambridge	92	20%	1	1	1895	4706	1214584	30%
Spruce Street	Everett Avenue	Chelsea	141	30%	1	1	4074	0	1148868	29%
Bishop Allen Drive	Prospect Street	Cambridge	86	18%	1	1	1895	4706	1135372	28%
Massachusetts Avenue	Windsor Street	Cambridge	111	24%	1	1	302	4706	1111776	28%
Broadway	Shurtleff Street	Chelsea	128	27%	1	1	4074	168	1085952	27%
Boston Street	Washington Street	Lynn	167	36%	1	1	3235	0	1080490	27%
Market Street	Oxford Street	Lynn	167	36%	1	1	3235	0	1080490	27%
Chestnut Street	Everett Avenue	Chelsea	113	24%	1	1	4074	171	959370	24%
Liberty Street	Central Avenue	Lynn	134	29%	1	1	3235	304	948452	24%
Essex Street	Joyce Street	Lynn	240	51%	1	1	1946	0	934080	23%
Pleasant Street	Green Street	Cambridge	70	15%	1	1	1895	4706	924140	23%
Washington Street	Henry Avenue	Lynn	138	29%	1	1	3235	0	892860	22%
Prospect Street	Hampshire Street	Cambridge	112	24%	1	1	802	3083	870240	22%
Oxford Street	Central Avenue	Lynn	121	26%	1	1	3235	304	856438	21%
Massachusetts Avenue	Amherst Street	Cambridge	88	19%	1	1	0	4706	828256	21%
Massachusetts Avenue	Putnam Avenue	Cambridge	88	19%	1	1	0	4706	828256	21%
Memorial Drive Underpass	Memorial Drive	Cambridge	87	19%	1	1	0	4706	818844	21%
Market Street	Andrew Street	Lynn	110	23%	1	1	3235	304	778580	20%
Second Street	Spruce Street	Chelsea	95	20%	1	1	4074	0	774060	19%
Mount Auburn Street	Dewolfe Street	Cambridge	65	14%	1	1	1224	4706	770900	19%
Union Street	Smith Street	Lynn	176	37%	1	1	1946	193	752928	19%
Broad Street	Market Street	Lynn	116	25%	1	1	3235	0	750520	19%
Washington Avenue	Chestnut Street	Chelsea	87	19%	1	1	4074	168	738108	18%
Broadway	Prospect Street	Cambridge	92	20%	1	1	802	3083	714840	18%
Hawthorn Street	Pearl Street	Chelsea	87	19%	1	1	4074	0	708876	18%
Columbia Street	Hampshire Street	Cambridge	111	24%	1	1	0	3083	684426	17%
Mcgrath Highway	Washington Street	Somerville	325	69%	1	1	361	685	679900	17%
Chatham Street	Timson Street	Lynn	172	37%	1	1	1946	0	669424	17%
Hancock Street	School Street	Quincy	205	44%	1	1	1549	0	635090	16%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Liberty Street	Buffum Street	Lynn	86	18%	1	1	3235	304	608708	15%
Pleasant Street	Wheeler Street	Lynn	94	20%	1	1	3235	0	608180	15%
Central Avenue	Shawmut Street	Chelsea	74	16%	1	1	4074	0	602952	15%
Hampshire Street	Cambridge Street	Cambridge	155	33%	0	1	802	3083	602175	15%
Massachusetts Avenue	Norfolk Street	Cambridge	45	10%	1	1	1895	4706	594090	15%
Essex Street	Bishop Allen Drive	Cambridge	45	10%	1	1	1895	4706	594090	15%
Honorable Thomas S Burgin Parkway	Access Road	Quincy	383	81%	0	1	1549	0	593267	15%
Broad Street	Union Street	Lynn	90	19%	1	1	3235	0	582300	15%
Green Street	Magazine Street	Cambridge	44	9%	1	1	1895	4706	580888	15%
Essex Street	Chestnut Street	Lynn	146	31%	1	1	1946	0	568232	14%
Bishop Allen Drive		Cambridge	43	9%	1	1	1895	4706	567686	14%
Massachusetts Avenue	Temple Street	Cambridge	42	9%	1	1	1895	4706	554484	14%
Western Avenue	Franklin Street	Cambridge	42	9%	1	1	1895	4706	554484	14%
Hampshire Street	Tremont Street	Cambridge	71	15%	1	1	802	3083	551670	14%
Everett Avenue	Walnut Street	Chelsea	67	14%	1	1	4074	0	545916	14%
Essex Street	Chatham Street	Lynn	140	30%	1	1	1946	0	544880	14%
Washington Street	Essex Street	Lynn	80	17%	1	1	3235	150	541600	14%
Cambridge Street	Prospect Street	Cambridge	69	15%	1	1	802	3083	536130	13%
Union Street	Buffum Street	Lynn	115	24%	1	1	1946	193	491970	12%
Munroe Street	Washington Street	Lynn	66	14%	1	1	3235	304	467148	12%
Main Street	Windsor Street	Cambridge	49	10%	1	1	0	4706	461188	12%
Beacon Hill Avenue	Lawton Avenue	Lynn	69	15%	1	1	3235	0	446430	11%
Massachusetts Avenue	Prospect Street	Cambridge	33	7%	1	1	1895	4706	435666	11%
Broadway	Portland Street	Cambridge	111	24%	1	1	240	1696	429792	11%
Parking Way	Access Road	Quincy	269	57%	0	1	1549	0	416681	10%
John F Kennedy Street	Eliot Street	Cambridge	91	19%	1	1	1224	974	400036	10%
Winnisimmet Street	Park Street	Chelsea	47	10%	1	1	4074	171	399030	10%
Union Street	School Street	Lynn	92	20%	1	1	1946	193	393576	10%
Waverly Street	Irving Street	Framingham	171	36%	1	1	914	234	392616	10%
Everett Avenue	Arlington Street	Chelsea	48	10%	1	1	4074	0	391104	10%
Spruce Street	Auburn Street	Chelsea	48	10%	1	1	4074	0	391104	10%
Market Street	Liberty Street	Lynn	53	11%	1	1	3235	304	375134	9%
Blossom Street	Spruce Street	Chelsea	46	10%	1	1	4074	0	374808	9%
Second Street	Chestnut Street	Chelsea	46	10%	1	1	4074	0	374808	9%
Broadway	Fourth Street	Chelsea	45	10%	1	1	4074	0	366660	9%
Shurtleff Street	Bellingham Street	Chelsea	42	9%	1	1	4074	168	356328	9%
Essex Street	Rogers Avenue	Lynn	52	11%	1	1	3235	150	352040	9%
Everett Avenue	Vale Street	Chelsea	43	9%	1	1	4074	0	350364	9%
Elm Street	Cambridge Street	Cambridge	44	9%	1	1	802	3083	341880	9%
Massachusetts Avenue	State Street	Cambridge	25	5%	1	1	1895	4706	330050	8%
Bishop Allen Drive	Columbia Street	Cambridge	25	5%	1	1	1895	4706	330050	8%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Union Street	Green Street	Lynn	76	16%	1	1	1946	193	325128	8%
Washington Street	Canal Street	Salem	147	31%	1	1	843	261	324576	8%
Franklin Street	North Common Street	Lynn	49	10%	1	1	3235	0	317030	8%
Green Street	Western Avenue	Cambridge	24	5%	1	1	1895	4706	316848	8%
Essex Street	Sutton Street	Lynn	46	10%	1	1	3235	150	311420	8%
Pleasant Street	Alley Street	Lynn	48	10%	1	1	3235	0	310560	8%
Norfolk Street	Bishop Allen Drive	Cambridge	23	5%	1	1	1895	4706	303646	8%
Fayette Street	Essex Street	Lynn	78	17%	1	1	1946	0	303576	8%
Magazine Street	William Street	Cambridge	44	9%	1	0	1895	4706	290444	7%
Massachusetts Avenue	Pleasant Street	Cambridge	22	5%	1	1	1895	4706	290444	7%
Western Avenue	Pleasant Street	Cambridge	22	5%	1	1	1895	4706	290444	7%
Green Street	Sidney Street	Cambridge	22	5%	1	1	1895	4706	290444	7%
Mount Auburn Street	John F Kennedy Street	Cambridge	66	14%	1	1	1224	974	290136	7%
Windsor Street	Hampshire Street	Cambridge	46	10%	1	1	0	3083	283636	7%
Galileo Galilei Way	Broadway	Cambridge	73	16%	1	1	240	1696	282656	7%
Washington Street	Lyman Street	Lynn	43	9%	1	1	3235	0	278210	7%
Park Street	Western Avenue	Lynn	223	47%	1	1	614	0	273844	7%
Newport Avenue	Beale Street	Quincy	288	61%	1	1	469	0	270144	7%
Beacon Street	Park Street	Somerville, Cambridge	43	9%	1	1	0	3083	265138	7%
Broadway	Second Street	Chelsea	32	7%	1	1	4074	0	260736	7%
Massachusetts Avenue	Front Street	Cambridge	26	6%	1	1	302	4706	260416	7%
Waverly Street	South Street	Framingham	112	24%	1	1	914	234	257152	6%
Western Avenue	Congress Street	Lynn	207	44%	1	1	614	0	254196	6%
Washington Street	New Derby Street	Salem	115	24%	1	1	843	261	253920	6%
Harvard Street	Beacon Street	Brookline	239	51%	0	1	565	496	253579	6%
Broadway	Columbia Street	Cambridge	70	15%	1	1	0	1696	237440	6%
Broadway	Windsor Street	Cambridge	69	15%	1	1	0	1696	234048	6%
Mcgrath Highway	Washington Street	Quincy	337	72%	1	1	344	0	231856	6%
Southern Artery		Quincy	233	50%	1	1	490	0	228340	6%
Everett Avenue	Fourth Street	Chelsea	28	6%	1	1	4074	0	228144	6%
Broadway	Inman Street	Cambridge	67	14%	1	1	0	1696	227264	6%
Putnam Avenue	Surrey Street	Cambridge	24	5%	1	1	0	4706	225888	6%
Chestnut Street	Union Street	Lynn	57	12%	1	1	1946	0	221844	6%
Windsor Street	Front Street	Cambridge	22	5%	1	1	302	4706	220352	6%
Cambridge Street	Columbia Street	Cambridge	87	19%	1	1	802	464	220284	6%
Broadway	Tremont Street	Cambridge	44	9%	1	1	802	1696	219824	6%
Beacon Street	Washington Street	Somerville	71	15%	0	1	0	3083	218893	5%
Massachusetts Avenue	Bay Street	Cambridge	23	5%	1	1	0	4706	216476	5%
Albany Street	Portland Street	Cambridge	23	5%	1	1	0	4706	216476	5%
Cambridge Street	Lambert Street	Cambridge	134	29%	1	1	299	494	212524	5%
Centre Street	Main Street	Malden	212	45%	1	1	500	0	212000	5%
Hawthorn Street	Central Avenue	Chelsea	26	6%	1	1	4074	0	211848	5%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Massachusetts Avenue	Peabody Street	Cambridge	48	10%	1	1	1224	974	211008	5%
Hancock Street	Washington Street	Quincy	67	14%	1	1	1549	0	207566	5%
Western Avenue	Franklin Street	Lynn	169	36%	1	1	614	0	207532	5%
Massachusetts Avenue	Dana Street	Cambridge	22	5%	1	1	0	4706	207064	5%
Green Street	Putnam Avenue	Cambridge	22	5%	1	1	0	4706	207064	5%
Massachusetts Avenue	Remington Street	Cambridge	22	5%	1	1	0	4706	207064	5%
Mount Auburn Street	Banks Street	Cambridge	22	5%	1	1	0	4706	207064	5%
Brattle Street	John F Kennedy Street	Cambridge	47	10%	1	1	1224	974	206612	5%
Broadway	Gerrish Avenue	Chelsea	25	5%	1	1	4074	0	203700	5%
Hancock Street		Quincy	65	14%	1	1	1549	0	201370	5%
Washington Street		Lynn	31	7%	1	1	3235	0	200570	5%
Revere Beach Parkway	Washington Avenue	Chelsea	351	75%	1	1	280	0	196560	5%
Washington Avenue		Chelsea	24	5%	1	1	4074	0	195552	5%
Washington Avenue	Bloomington Street	Chelsea	24	5%	1	1	4074	0	195552	5%
Maverick Street	Shawmut Street	Chelsea	24	5%	1	1	4074	0	195552	5%
Cherry Street	Everett Avenue	Chelsea	23	5%	1	1	4074	171	195270	5%
Liberty Street	Stewart Street	Lynn	27	6%	1	1	3235	304	191106	5%
Mount Auburn Street	Holyoke Street	Cambridge	43	9%	1	1	1224	974	189028	5%
Massachusetts Avenue		Cambridge	97	21%	1	1	0	974	188956	5%
Washington Avenue	Blossom Street	Chelsea	23	5%	1	1	4074	0	187404	5%
Central Avenue	Lynn Street	Chelsea	23	5%	1	1	4074	0	187404	5%
Addison Street	Spruce Street	Chelsea	23	5%	1	1	4074	0	187404	5%
Fourth Street	Arlington Street	Chelsea	23	5%	1	1	4074	0	187404	5%
Chestnut Street	Fifth Street	Chelsea	22	5%	1	1	4074	168	186648	5%
Cambridge Street	Tremont Street	Cambridge	24	5%	1	1	802	3083	186480	5%
Somerville Avenue	Prospect Street	Somerville	93	20%	1	1	317	685	186372	5%
Chestnut Street	Ashton Square	Lynn	47	10%	1	1	1946	0	182924	5%
Cambridge Street	Cardinal Medeiros Avenue	Cambridge	114	24%	1	1	299	494	180804	5%
Franklin Street	Baker Street	Lynn	147	31%	1	1	614	0	180516	5%
Main Street	Elm Street	Waltham	114	24%	1	1	572	215	179436	4%
Everett Avenue	Spruce Street	Chelsea	22	5%	1	1	4074	0	179256	4%
Central Avenue	Shurtleff Street	Chelsea	22	5%	1	1	4074	0	179256	4%
Everett Avenue		Chelsea	22	5%	1	1	4074	0	179256	4%
Heard Street	Eden Street	Chelsea	22	5%	1	1	4074	0	179256	4%
Second Street		Chelsea	22	5%	1	1	4074	0	179256	4%
Essex Street	Sheridan Street	Lynn	46	10%	1	1	1946	0	179032	4%
Essex Street	Essex Avenue	Lynn	46	10%	1	1	1946	0	179032	4%
Williams Avenue	Chatham Street	Lynn	46	10%	1	1	1946	0	179032	4%
Washington Street	Temple Street	Quincy	57	12%	1	1	1549	0	176586	4%
Southern Artery	Sea Street	Quincy	357	76%	0	1	490	0	174930	4%
Hampshire Street	Inman Street	Cambridge	45	10%	0	1	802	3083	174825	4%
Hamilton Avenue	Lawton Avenue	Lynn	27	6%	1	1	3235	0	174690	4%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Essex Street	Essex Court	Lynn	44	9%	1	1	1946	0	171248	4%
Lawton Avenue	High Rock Street	Lynn	26	6%	1	1	3235	0	168220	4%
Marginal Road	Washington Street	Boston	44	9%	1	1	1899	0	167112	4%
Essex Street	Dana Street	Lynn	42	9%	1	1	1946	0	163464	4%
Central Square	Munroe Street	Lynn	23	5%	1	1	3235	304	162794	4%
Willow Street	Oxford Street	Lynn	23	5%	1	1	3235	304	162794	4%
Lawton Avenue	Henry Avenue	Lynn	25	5%	1	1	3235	0	161750	4%
Broad Street		Lynn	25	5%	1	1	3235	0	161750	4%
Hancock Street	Granite Street	Quincy	52	11%	1	1	1549	0	161096	4%
Mystic Avenue	Temple Street	Somerville	164	35%	1	1	486	0	159408	4%
Medford Veterans Memorial Highway	Fellsway	Medford	286	61%	1	1	276	0	157872	4%
Central Avenue	Sutton Street	Lynn	22	5%	1	1	3235	304	155716	4%
Revere Beach Parkway	Fellsway	Medford	282	60%	1	1	276	0	155664	4%
Exchange Street	Spring Street	Lynn	24	5%	1	1	3235	0	155280	4%
Washington Street	Union Street	Lynn	24	5%	1	1	3235	0	155280	4%
Bristol Street	Hampshire Street	Cambridge	25	5%	1	1	0	3083	154150	4%
Cambridge Street	Quincy Street	Cambridge	91	19%	1	1	385	456	153062	4%
Massachusetts Avenue	Massachusetts Avenue Connector	Boston	159	34%	1	1	474	0	150732	4%
Massachusetts Avenue	Alewife Brook Parkway	Cambridge	229	49%	1	0	0	658	150682	4%
Massachusetts Avenue	Chauncy Street	Cambridge	68	14%	1	0	0	2210	150280	4%
Inman Street	Harvard Street	Cambridge	44	9%	1	1	0	1696	149248	4%
Market Street	Harrison Court	Lynn	23	5%	1	1	3235	0	148810	4%
Hancock Street	East Squantum Street	Quincy	200	43%	1	1	372	0	148800	4%
Revere Road	Mechanic Street	Quincy	48	10%	1	1	1549	0	148704	4%
Clark Street	Hampshire Street	Cambridge	22	5%	1	1	240	3083	146212	4%
Market Square	North Common Street	Lynn	168	36%	1	1	429	0	144144	4%
Webster Avenue	Clark Avenue	Chelsea	135	29%	1	1	533	0	143910	4%
Washington Street	Lloyd Street	Lynn	22	5%	1	1	3235	0	142340	4%
Harvard Street	Longwood Avenue	Brookline	66	14%	1	1	565	496	140052	4%
Washington Street	Maple Street	Quincy	45	10%	1	1	1549	0	139410	3%
Washington Street	Tufts Street	Somerville	66	14%	1	1	361	685	138072	3%
South Common Street	Commercial Street	Lynn	160	34%	1	1	429	0	137280	3%
Market Street	Windsor Street	Cambridge	22	5%	1	1	0	3083	135652	3%
Beacon Street	Properzi Way	Somerville,Cambridge	22	5%	1	1	0	3083	135652	3%
Riverway	Longwood Avenue	Boston	266	57%	1	1	0	252	134064	3%
Main Street	Bacon Street	Waltham	69	15%	1	1	764	197	132618	3%
Arlington Street	Mount Auburn Street	Watertown	154	33%	1	1	275	149	130592	3%
Summer Street	South Street	Lynn	203	43%	1	1	321	0	130326	3%
Broadway		Revere	94	20%	1	1	689	0	129532	3%
Main Street	Charles Street	Malden	129	27%	1	1	500	0	129000	3%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Market Street	Essex Street	Lynn	19	4%	1	1	3235	150	128630	3%
Washington Street	Bonner Avenue	Somerville	64	14%	1	1	317	685	128256	3%
Howard Street	Concord Street	Framingham	55	12%	1	1	914	234	126280	3%
Windsor Street	Cambridge Street	Cambridge	49	10%	1	1	802	464	124068	3%
Fifth Street	Cambridge Street	Cambridge	94	20%	1	1	639	0	120132	3%
Broadway	Mountain Avenue	Revere	87	19%	1	1	689	0	119886	3%
Mcgrath Highway	Fellsway	Somerville	176	37%	1	1	339	0	119328	3%
Monsignor Obrien Highway	Third Street	Cambridge	92	20%	1	1	639	0	117576	3%
Granite Street	Honorable Thomas S Burgin Parkway	Quincy	183	39%	1	1	320	0	117120	3%
Southern Artery	Morrison Street	Quincy	236	50%	0	1	490	0	115640	3%
Broadway	Felton Street	Cambridge	67	14%	1	1	385	456	112694	3%
Norman Street	Summer Street	Salem	102	22%	0	1	843	261	112608	3%
Irving Street	Hollis Street	Framingham	49	10%	1	1	914	234	112504	3%
Market Square	Western Avenue	Lynn	131	28%	1	1	429	0	112398	3%
Main Street	Madison Street	Malden	111	24%	1	1	500	0	111000	3%
Massachusetts Avenue		Cambridge	25	5%	1	1	1224	974	109900	3%
Magazine Street	Cottage Street	Cambridge	23	5%	1	0	0	4706	108238	3%
Hancock Street	Whitney Road	Quincy	97	21%	1	1	556	0	107864	3%
Lafayette Street	Dow Street	Salem	63	13%	1	1	843	0	106218	3%
School Street	Parking Way	Quincy	68	14%	0	1	1549	0	105332	3%
Harvard Street	Quincy Street	Cambridge	43	9%	1	1	1224	0	105264	3%
Chestnut Street	Mason Street	Lynn	27	6%	1	1	1946	0	105084	3%
Newport Avenue	Brook Street	Quincy	112	24%	1	1	469	0	105056	3%
Chestnut Street	Burrus Square	Lynn	205	44%	1	1	256	0	104960	3%
Hancock Street	Russell Park	Quincy	92	20%	1	1	556	0	102304	3%
Main Street	Hammond Street	Waltham	53	11%	1	1	764	197	101866	3%
Broadway	Eastern Avenue	Chelsea	95	20%	1	1	533	0	101270	3%
Hampshire Street	Cardinal Medeiros Avenue	Cambridge	26	6%	1	1	240	1696	100672	3%
Warren Street	Commercial Street	Lynn	156	33%	1	1	321	0	100152	3%
Hollis Street	Gordon Street	Framingham	43	9%	1	1	914	234	98728	2%
Silsbee Street	Ellis Street	Lynn	23	5%	1	1	1946	193	98394	2%
Lewis Street	Chestnut Street	Lynn	176	37%	1	1	278	0	97856	2%
	Storrow Drive	Boston	87	19%	1	1	0	561	97614	2%
Fayette Street	Trinity Avenue	Lynn	25	5%	1	1	1946	0	97300	2%
Lafayette Street	Peabody Street	Salem	44	9%	1	1	843	261	97152	2%
Harbor Street	Lafayette Street	Salem	44	9%	1	1	843	261	97152	2%
Mount Auburn Street	Dunster Street	Cambridge	22	5%	1	1	1224	974	96712	2%
Peabody Street	Cambridge Street	Cambridge	22	5%	1	1	1224	974	96712	2%
Centre Street	Commercial Street	Malden	203	43%	1	1	235	0	95410	2%
Massachusetts Avenue	Mellen Street	Cambridge	43	9%	1	0	0	2210	95030	2%
Kneeland Street	John F Fitzgerald Expressway	Boston	25	5%	1	1	1899	0	94950	2%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Massachusetts Avenue	Harvey Street	Cambridge	129	27%	1	0	0	733	94557	2%
Washington Street	Boston Street	Somerville	45	10%	1	1	361	685	94140	2%
Union Street		Lynn	22	5%	1	1	1946	193	94116	2%
Essex Street	Lincoln Street	Lynn	24	5%	1	1	1946	0	93408	2%
Essex Street	Tilton Place	Lynn	24	5%	1	1	1946	0	93408	2%
Eastern Avenue	Cabot Street	Chelsea	87	19%	1	1	533	0	92742	2%
Washington Street	Joy Street	Somerville	44	9%	1	1	361	685	92048	2%
Hancock Street	Beach Street	Quincy	97	21%	1	1	469	0	90986	2%
Columbia Road	Buttonwood Street	Boston	194	41%	1	1	231	0	89628	2%
Essex Street	Jackson Street	Lynn	23	5%	1	1	1946	0	89516	2%
Lafayette Street	Dodge Street	Salem	44	9%	1	1	843	170	89144	2%
Main Street	Grant Street	Waltham	45	10%	1	1	764	197	86490	2%
Concord Street	Kendall Street	Framingham	47	10%	1	1	914	0	85916	2%
Arlington Street		Framingham	47	10%	1	1	914	0	85916	2%
Essex Street	Essex Circle	Lynn	22	5%	1	1	1946	0	85624	2%
Essex Street	Fayette Street	Lynn	22	5%	1	1	1946	0	85624	2%
Fayette Street	Trinity Terrace	Lynn	22	5%	1	1	1946	0	85624	2%
Sheridan Street	Chestnut Avenue	Lynn	22	5%	1	1	1946	0	85624	2%
Cambridge Street	Hampshire Street	Cambridge	22	5%	0	1	802	3083	85470	2%
Cambridge Street	Oak Street	Cambridge	22	5%	0	1	802	3083	85470	2%
Lafayette Street	Palmer Street	Salem	50	11%	1	1	843	0	84300	2%
Galileo Galilei Way	Main Street	Cambridge	131	28%	1	1	0	321	84102	2%
Tyler Street	Kneeland Street	Boston	22	5%	1	1	1899	0	83556	2%
Pearl Street	Franklin Street	Cambridge	22	5%	1	1	1895	0	83380	2%
Massachusetts Avenue	Albany Street	Boston	87	19%	1	1	474	0	82476	2%
Essex Street	Eastern Avenue	Lynn	191	41%	1	1	215	0	82130	2%
Mcgrath Highway	Broadway	Somerville	121	26%	1	1	339	0	82038	2%
Thorndike Street	Fifth Street	Cambridge	64	14%	1	1	639	0	81792	2%
Revere Beach Parkway	Fellsway	Medford	147	31%	1	1	276	0	81144	2%
Franklin Street	Brookline Street	Cambridge	6	1%	1	1	1895	4706	79212	2%
Commercial Street	Summer Street	Lynn	123	26%	1	1	321	0	78966	2%
Elm Street	Carter Street	Waltham	69	15%	1	1	572	0	78936	2%
Concord Street	Park Street	Framingham	43	9%	1	1	914	0	78604	2%
Concord Street	Frederick Street	Framingham	43	9%	1	1	914	0	78604	2%
Beacon Street	Concord Avenue	Somerville	25	5%	0	1	0	3083	77075	2%
Broadway	Norfolk Street	Cambridge	22	5%	1	1	0	1696	74624	2%
Market Street	Columbia Street	Cambridge	22	5%	1	1	0	1696	74624	2%
Chestnut Street	Cottage Avenue	Quincy	24	5%	1	1	1549	0	74352	2%
Fellsway West	Salem Street	Medford	76	16%	1	1	488	0	74176	2%
Harrison Avenue	Dudley Street	Boston	133	28%	1	1	277	0	73682	2%
Hancock Street	Huntly Road	Quincy	66	14%	1	1	556	0	73392	2%
Whitwell Street		Quincy	47	10%	1	0	1549	0	72803	2%

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Broadway		Chelsea	68	14%	1	1	533	0	72488	2%
Soldiers Field Road	North Harvard Street	Boston	171	36%	1	1	0	211	72162	2%
Columbia Road	Dorchester Avenue	Boston	156	33%	1	1	231	0	72072	2%
West Squantum Street	Ramp-Newport Ave Ext To West Squantum St	Quincy	96	20%	1	1	372	0	71424	2%
Granite Street	Parking Way	Quincy	23	5%	1	1	1549	0	71254	2%
Elm Street	Mechanic Street	Quincy	23	5%	1	1	1549	0	71254	2%
Western Avenue	Centre Street	Lynn	83	18%	1	1	429	0	71214	2%
Elm Street	Central Street	Waltham	45	10%	1	1	572	215	70830	2%
Lafayette Street	Leavitt Street	Salem	42	9%	1	1	843	0	70812	2%
Warren Street	Dudley Street	Boston	127	27%	1	1	277	0	70358	2%
School Street	Pleasant Street	Quincy	45	10%	1	0	1549	0	69705	2%
Beach Street	Ocean Avenue	Revere	136	29%	1	1	255	0	69360	2%
Western Avenue	Soldiers Field Road	Boston	147	31%	1	1	0	233	68502	2%
Ellery Street	Broadway	Cambridge	75	16%	1	1	0	456	68400	2%
Gillooly Road	Stockton Street	Chelsea	64	14%	1	1	533	0	68224	2%
Main Street	Fiske Street	Waltham	35	7%	1	1	764	197	67270	2%
Chestnut Street	Williams Street	Chelsea	113	24%	1	1	296	0	66896	2%
Cambridge Street	Monsignor Obrien Highway	Cambridge	52	11%	1	1	639	0	66456	2%
Hancock Street	Massachusetts Avenue	Cambridge	5	1%	1	1	1895	4706	66010	2%
Putnam Avenue	Kinnaird Street	Cambridge	7	1%	1	1	0	4706	65884	2%
Beach Street	North Shore Road	Revere	129	27%	1	1	255	0	65790	2%
Monsignor Obrien Highway	Edwin H Land Boulevard	Cambridge	171	36%	1	1	0	192	65664	2%
Chapman Street	Beale Street	Quincy	70	15%	1	1	469	0	65660	2%
Mystic Avenue	Interstate 93	Somerville	67	14%	1	1	486	0	65124	2%
Moody Street	Pine Street	Waltham	70	15%	1	1	465	0	65100	2%
Broadway	Malden Street	Revere	128	27%	1	1	254	0	65024	2%
Broadway	Park Avenue	Revere	47	10%	1	1	689	0	64766	2%
Western Avenue	Leo M Birmingham Parkway	Boston	137	29%	1	1	0	233	63842	2%
Fellsway		Medford	113	24%	1	1	276	0	62376	2%
Union Square	Stone Avenue	Somerville	31	7%	1	1	317	685	62124	2%
Massachusetts Avenue	Cedar Street	Cambridge	42	9%	1	1	0	733	61572	2%
Broadway	Beach Street	Revere	44	9%	1	1	689	0	60632	2%
Brown Street	Moody Street	Waltham	93	20%	1	1	322	0	59892	2%
Congress Avenue	Division Street	Chelsea	7	1%	1	1	4074	171	59430	1%
Main Street	Washington Street	Peabody	117	25%	1	1	253	0	59202	1%
Third Street	Cambridge Street	Cambridge	91	19%	1	0	639	0	58149	1%
Broadway	Reservoir Avenue	Revere	42	9%	1	1	689	0	57876	1%
Central Avenue		Revere	42	9%	1	1	689	0	57876	1%
Lexington Street	School Street	Waltham	50	11%	1	1	572	0	57200	1%
Harvard Street	Aspinwall Avenue	Brookline	92	20%	1	1	0	304	55936	1%
Arlington Street	Grove Street	Watertown	65	14%	1	1	275	149	55120	1%

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Columbia Road		Boston	71	15%	1	1	383	0	54386	1%
West Squantum Street	Holmes Street	Quincy	73	16%	1	1	372	0	54312	1%
Otis Street	Fifth Street	Cambridge	42	9%	1	1	639	0	53676	1%
Main Street	Lexington Street	Waltham	34	7%	1	1	572	215	53516	1%
Massachusetts Avenue	Inman Street	Cambridge	4	1%	1	1	1895	4706	52808	1%
Sidney Street	Franklin Street	Cambridge	4	1%	1	1	1895	4706	52808	1%
Franklin Street	Magazine Street	Cambridge	4	1%	1	1	1895	4706	52808	1%
Newport Avenue		Quincy	95	20%	1	1	277	0	52630	1%
Derby Street	Congress Street	Salem	31	7%	1	1	843	0	52266	1%
Hancock Street	Adams Street	Quincy	47	10%	1	1	556	0	52264	1%
Main Street	Howard Street	Waltham	27	6%	1	1	764	197	51894	1%
Norman Street	Margin Street	Salem	47	10%	0	1	843	261	51888	1%
Union Street	Central Square	Lynn	8	2%	1	1	3235	0	51760	1%
Broadway	Stockton Street	Chelsea	48	10%	1	1	533	0	51168	1%
Mount Auburn Street	Brattle Square	Cambridge	23	5%	1	0	1224	974	50554	1%
Prospect Street	Russell Street	Waltham	33	7%	1	1	764	0	50424	1%
Moody Street	Charles Street	Waltham	32	7%	1	1	572	215	50368	1%
Washington Street	Ramp-Washington St To Rt 28 Nb	Somerville	24	5%	1	1	361	685	50208	1%
Washington Street	Essex Street	Salem	86	18%	0	1	322	261	50138	1%
Broad Street	Green Street	Lynn	90	19%	1	1	278	0	50040	1%
Howard Street	Freeman Street	Framingham	27	6%	1	1	914	0	49356	1%
Washington Street	Ropes Street	Salem	22	5%	1	1	843	261	48576	1%
New Derby Street	Dodge Street Court	Salem	22	5%	1	1	843	261	48576	1%
Massachusetts Avenue	Marlborough Street	Boston	43	9%	1	1	0	561	48246	1%
Washington Street	Columbus Avenue	Somerville	23	5%	1	1	361	685	48116	1%
Broadway	Cabot Street	Chelsea	45	10%	1	1	533	0	47970	1%
Broadway	Temple Street	Somerville	49	10%	1	1	486	0	47628	1%
John F Fitzgerald Expressway	Ramp-Rts 90 Wb/1A Sb To Rts 93 Nb/3 Nb	Boston	25	5%	0	1	1899	0	47475	1%
Broadway	School Street	Revere	93	20%	1	1	254	0	47244	1%
Hancock Street	Elm Avenue	Quincy	50	11%	1	1	469	0	46900	1%
Harvard Street	Webster Street	Brookline	22	5%	1	1	565	496	46684	1%
Lafayette Street	New Derby Street	Salem	23	5%	1	1	843	170	46598	1%
Washington Street	Elm Street	Quincy	67	14%	1	1	344	0	46096	1%
Brookline Avenue	Riverway	Boston	136	29%	1	1	0	169	45968	1%
Salem Street	Spring Street	Medford	47	10%	1	1	488	0	45872	1%
Broadway	Walnut Street	Somerville	47	10%	1	1	486	0	45684	1%
Lawton Avenue	Laighton Street	Lynn	7	1%	1	1	3235	0	45290	1%
Main Street	Francis Street	Waltham	23	5%	1	1	764	197	44206	1%
Southern Artery	Brackett Street	Quincy	90	19%	0	1	490	0	44100	1%
Williams Street	Winnisimmet Street	Chelsea	74	16%	1	1	296	0	43808	1%

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TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Memorial Drive	John F Kennedy Street	Cambridge	114	24%	1	1	0	192	43776	1%
Main Street	Caller Street	Peabody	86	18%	1	1	253	0	43516	1%
Hancock Street	Revere Road	Quincy	14	3%	1	1	1549	0	43372	1%
Massachusetts Avenue	Harrison Avenue	Boston	85	18%	1	1	254	0	43180	1%
Beale Street	Greenwood Avenue	Quincy	46	10%	1	1	469	0	43148	1%
Temple Street	Butler Drive	Somerville	44	9%	1	1	486	0	42768	1%
Central Avenue	Washington Street	Lynn	6	1%	1	1	3235	304	42468	1%
Central Avenue	Washington Street	Lynn	6	1%	1	1	3235	304	42468	1%
Moody Street	Felton Street	Waltham	37	8%	1	1	572	0	42328	1%
Russell Street	Harvard Street	Waltham	22	5%	1	1	764	197	42284	1%
Concord Street	Sanger Street	Framingham	23	5%	1	1	914	0	42044	1%
Hollis Street	Clafin Street	Framingham	23	5%	1	1	914	0	42044	1%
Centre Street	Middlesex Street	Malden	42	9%	1	1	500	0	42000	1%
Kneeland Street	Lincoln Street Connector	Boston	22	5%	0	1	1899	0	41778	1%
Cambridge Street	Sumner Road	Cambridge	23	5%	1	1	385	519	41584	1%
Cambridge Street	Felton Street	Cambridge	23	5%	1	1	385	519	41584	1%
Main Street	Wellington Street	Waltham	27	6%	1	1	764	0	41256	1%
Summer Street	Lowell Street	Lynn	64	14%	1	1	321	0	41088	1%
Heard Street	Spruce Street	Chelsea	5	1%	1	1	4074	0	40740	1%
Essex Street	Empire Street	Lynn	94	20%	1	1	215	0	40420	1%
Quincy Street	Broadway	Cambridge	24	5%	1	1	385	456	40368	1%
Newbury Street	Massachusetts Avenue	Boston	26	6%	1	1	215	561	40352	1%
Fellsway		Medford	73	16%	1	1	276	0	40296	1%
Windsor Street	State Street	Cambridge	4	1%	1	1	302	4706	40064	1%
Hancock Street	Billings Road	Quincy	72	15%	1	1	277	0	39888	1%
Broadway	Eleanor Street	Chelsea	67	14%	1	1	297	0	39798	1%
Cambridge Street	Ellery Street	Cambridge	22	5%	1	1	385	519	39776	1%
Massachusetts Avenue	Essex Street	Cambridge	3	1%	1	1	1895	4706	39606	1%
Green Street	Brookline Street	Cambridge	3	1%	1	1	1895	4706	39606	1%
Auburn Street	Magazine Street	Cambridge	3	1%	1	1	1895	4706	39606	1%
Waverly Street	Fountain Street	Framingham	92	20%	1	1	215	0	39560	1%
Park Drive	Brookline Avenue	Boston	117	25%	1	1	0	169	39546	1%
Main Street	North Bow Street	Milford	76	16%	1	1	257	0	39064	1%
Lafayette Street	Porter Street	Salem	23	5%	1	1	843	0	38778	1%
Lafayette Street	Cedar Street	Salem	23	5%	1	1	843	0	38778	1%
Hancock Street	Hollis Avenue	Quincy	52	11%	1	1	372	0	38688	1%
Banks Street	Surrey Street	Cambridge	4	1%	1	1	0	4706	37648	1%
Moody Street	Maple Street	Waltham	40	9%	1	1	465	0	37200	1%
Dow Street	Salem Street	Salem	22	5%	1	1	843	0	37092	1%
North Common Street	Park Street	Lynn	43	9%	1	1	429	0	36894	1%
Main Street	Rich Street	Waltham	24	5%	1	1	764	0	36672	1%
Monsignor Obrien Highway		Cambridge	94	20%	1	1	0	192	36096	1%

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TABLE 1
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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Brookline Street	Granite Street	Cambridge	42	9%	1	1	0	426	35784	1%
William T Morrissey Boulevard	Mount Vernon Street	Boston	29	6%	1	1	383	233	35728	1%
Broadway	Williams Street	Chelsea	60	13%	1	1	296	0	35520	1%
Broadway	Webster Avenue	Chelsea	33	7%	1	1	533	0	35178	1%
Cambridge Street	Harding Street	Cambridge	23	5%	1	1	299	464	35098	1%
Main Street	Common Street	Waltham	22	5%	1	1	572	215	34628	1%
Cambridge Street	Sixth Street	Cambridge	27	6%	1	1	639	0	34506	1%
Dummer Street	Saint Paul Street	Brookline	67	14%	1	1	0	257	34438	1%
Main Street	Howley Street	Peabody	68	14%	1	1	253	0	34408	1%
Dehon Street	North Shore Road	Revere	67	14%	1	1	255	0	34170	1%
Commonwealth Avenue	Massachusetts Avenue	Boston	22	5%	1	1	215	561	34144	1%
Haviland Street	Edgerly Road	Boston	22	5%	1	1	215	561	34144	1%
Congress Avenue	Park Street	Chelsea	4	1%	1	1	4074	171	33960	1%
Main Street	Spruce Street	Milford	65	14%	1	1	257	0	33410	1%
Norman Street	Crombie Street	Salem	30	6%	0	1	843	261	33120	1%
Washington Avenue	Addison Street	Chelsea	4	1%	1	1	4074	0	32592	1%
Lewis Street	Chatham Street	Lynn	69	15%	1	1	234	0	32292	1%
Longwood Avenue	Chapel Street	Brookline	64	14%	1	1	0	252	32256	1%
Park Avenue	Foster Street	Revere	23	5%	1	1	689	0	31694	1%
Elm Street	River Street	Waltham	27	6%	1	1	572	0	30888	1%
Columbia Road	Ramp-Rts 93 Nb/3 Nb To Columbia Rd	Boston	25	5%	1	1	383	233	30800	1%
Massachusetts Avenue	Edmunds Street	Cambridge	42	9%	1	0	0	733	30786	1%
Franklin Street	Lyman Street	Lynn	25	5%	1	1	614	0	30700	1%
Beacon Street	Oxford Street	Somerville,Cambridge	65	14%	1	1	0	235	30550	1%
Morton Street	Theodore Street	Boston	65	14%	1	1	231	0	30030	1%
Beale Street	Old Colony Avenue	Quincy	32	7%	1	1	469	0	30016	1%
Veterans Of Foreign Wars Parkway	Beach Street	Revere	44	9%	1	1	339	0	29832	1%
Franklin Street	Hanover Street	Lynn	49	10%	1	1	304	0	29792	1%
Mcgrath Highway	Rufo Road	Somerville,Cambridge	23	5%	1	1	639	0	29394	1%
Somerville Avenue	Quincy Street	Somerville	43	9%	1	1	0	339	29154	1%
Boylston Street	Washington Street	Brookline	47	10%	1	1	0	304	28576	1%
Mount Vernon Street	William J Day Boulevard	Boston	23	5%	1	1	383	233	28336	1%
Kosciuszko Circle	William J Day Boulevard	Boston	23	5%	1	1	383	233	28336	1%
Moody Street	Alder Street	Waltham	44	9%	1	1	322	0	28336	1%
Main Street	Sumner Street	Milford	55	12%	1	1	257	0	28270	1%
Green Street	Hancock Street	Cambridge	3	1%	1	1	0	4706	28236	1%
Sciarappa Street	Cambridge Street	Cambridge	22	5%	1	1	639	0	28116	1%
	East Street	Cambridge	22	5%	1	1	639	0	28116	1%
Main Street	Craven Circle	Waltham	51	11%	1	1	0	274	27948	1%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
North Common Street	South Hannify Square	Lynn	47	10%	1	1	296	0	27824	1%
Louis Street	Eastern Avenue	Chelsea	26	6%	1	1	533	0	27716	1%
Cary Avenue	Broadway	Chelsea	46	10%	1	1	297	0	27324	1%
Arlington Street	Albany Street	Lynn	22	5%	1	1	614	0	27016	1%
Somerville Avenue	Craigie Street	Somerville	23	5%	1	1	0	584	26864	1%
Somerville Avenue	Garden Court	Somerville	23	5%	1	1	0	584	26864	1%
Commonwealth Avenue	Harvard Avenue	Boston	52	11%	1	1	0	258	26832	1%
Milk Street	Kilby Street	Boston	23	5%	0	1	1166	0	26818	1%
Broadway	Parker Street	Chelsea	45	10%	1	1	297	0	26730	1%
Lewis Street	Lafayette Park	Lynn	48	10%	1	1	278	0	26688	1%
South Common Street	Pleasant Street	Lynn	45	10%	1	1	296	0	26640	1%
Massachusetts Avenue	Pearl Street	Cambridge	2	0%	1	1	1895	4706	26404	1%
Cambridge Street	North Grove Street	Boston	64	14%	0	1	259	151	26240	1%
Somerville Avenue	Lowell Street	Somerville	22	5%	1	1	0	584	25696	1%
Somerville Avenue	Belmont Street	Somerville	22	5%	1	1	0	584	25696	1%
Tremont Street	Bosworth Street	Boston	22	5%	0	1	1166	0	25652	1%
Washington Street	Boylston Street	Brookline	42	9%	1	1	0	304	25536	1%
Williams Street	Ramp-Everett Ave To Rt 1 Sb	Chelsea	43	9%	1	1	296	0	25456	1%
Broadway	Fifth Street	Chelsea	3	1%	1	1	4074	168	25452	1%
School Street	Common Street	Waltham	22	5%	1	1	572	0	25168	1%
Main Street	Florence Street	Malden	25	5%	1	1	500	0	25000	1%
Billings Road	Holmes Street	Quincy	45	10%	1	1	277	0	24930	1%
Temple Street	Hancock Street	Quincy	8	2%	1	1	1549	0	24784	1%
Plymouth Street	Webster Avenue	Cambridge	4	1%	1	1	0	3083	24664	1%
Broadway	Library Street	Chelsea	3	1%	1	1	4074	0	24444	1%
Massachusetts Avenue	Waterhouse Street	Cambridge	25	5%	1	0	0	974	24350	1%
Broadway	Marshall Street	Somerville	25	5%	1	1	486	0	24300	1%
Broadway	Grant Street	Somerville	25	5%	1	1	486	0	24300	1%
Mill Street	Margin Street	Salem	22	5%	0	1	843	261	24288	1%
Main Street	Appleton Street	Waltham	44	9%	1	1	0	274	24112	1%
Beacon Street	Westbourne Terrace	Brookline	86	18%	0	1	0	279	23994	1%
Washington Street	Ruggles Street	Boston	43	9%	1	1	277	0	23822	1%
Harrison Avenue	Zeigler Street	Boston	43	9%	1	1	277	0	23822	1%
Saint Paul Street	Beacon Street	Brookline	69	15%	1	1	0	172	23736	1%
Revere Beach Parkway	Union Street	Chelsea	42	9%	1	1	280	0	23520	1%
Shirley Avenue	Ocean Avenue	Revere	46	10%	1	1	255	0	23460	1%
Harvard Street	Babcock Street	Brookline	22	5%	0	1	565	496	23342	1%
Tremont Street	Carlisle Street	Cambridge	3	1%	1	1	802	3083	23310	1%
Main Street	City Hall Avenue	Malden	23	5%	1	1	500	0	23000	1%
Beacon Street	Webster Street	Brookline	23	5%	1	1	0	496	22816	1%
Brighton Avenue	Harvard Avenue	Boston	44	9%	1	1	0	259	22792	1%
Saint Paul Street	Browne Street	Brookline	66	14%	1	1	0	172	22704	1%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Commonwealth Avenue	Buick Street	Boston,Brookline	44	9%	1	1	0	257	22616	1%
Mystic Avenue	Taylor Street	Somerville	23	5%	1	1	486	0	22356	1%
Lafayette Street	Klop Alley	Salem	22	5%	0	1	843	170	22286	1%
Cambridge Street	Willow Street	Cambridge	24	5%	1	1	0	464	22272	1%
Charles Street	Middlesex Street	Malden	22	5%	1	1	500	0	22000	1%
Harvard Avenue	Brainerd Road	Boston	42	9%	1	1	0	258	21672	1%
Commonwealth Avenue	Amory Street	Boston,Brookline	42	9%	1	1	0	257	21588	1%
Salem Street	Sheridan Avenue	Medford	22	5%	1	1	488	0	21472	1%
Grant Avenue	Salem Street	Medford	22	5%	1	1	488	0	21472	1%
Western Avenue	Mall Street	Lynn	25	5%	1	1	429	0	21450	1%
Moody Street	Walnut Street	Waltham	23	5%	1	1	465	0	21390	1%
Jaques Street	Temple Street	Somerville	22	5%	1	1	486	0	21384	1%
Central Square		Lynn	3	1%	1	1	3235	304	21234	1%
Ramp-Sumner Tuni To Rt 93 Nb/Market St	Ramp-Sumner Tuni To Rt 3 Nb (Storrow Dr)	Boston	68	14%	0	1	303	0	20604	1%
South Common Street	Huss Court	Lynn	24	5%	1	1	429	0	20592	1%
North Common Street	Whiting Street	Lynn	24	5%	1	1	429	0	20592	1%
Moody Street	Taylor Street	Waltham	22	5%	1	1	465	0	20460	1%
Windsor Street	Evereteze Way	Cambridge	22	5%	1	1	0	464	20416	1%
Marlboro Street	Highland Street	Chelsea	44	9%	1	1	231	0	20328	1%
South Common Street	North Common Street	Lynn	3	1%	1	1	3235	150	20310	1%
Market Street		Lynn	3	1%	1	1	3235	150	20310	1%
Winthrop Avenue	Bennington Street	Revere	43	9%	1	1	232	0	19952	1%
Cambridge Street	Hovey Avenue	Cambridge	22	5%	0	1	385	519	19888	0%
Morton Street	Lucerne Street	Boston	43	9%	1	1	231	0	19866	0%
North Common Street	Mall Street	Lynn	23	5%	1	1	429	0	19734	0%
Fellsway	Middlesex Avenue	Medford	71	15%	1	0	276	0	19596	0%
Memorial Drive	Reid Rotary	Cambridge	23	5%	1	1	0	426	19596	0%
Union Street	Pinkham Street	Lynn	5	1%	1	1	1946	0	19460	0%
Morton Street	Greendale Road	Boston	45	10%	1	1	216	0	19440	0%
Market Street	Munroe Street	Lynn	3	1%	1	1	3235	0	19410	0%
Main Street	Lyman Street	Waltham	35	7%	1	1	0	274	19180	0%
Main Street	Liberty Street	Waltham	44	9%	1	1	0	215	18920	0%
Western Avenue	Brookvale Street	Lynn	22	5%	1	1	429	0	18876	0%
Massachusetts Avenue	Ellery Street	Cambridge	2	0%	1	1	0	4706	18824	0%
Hancock Street	Centre Street	Cambridge	2	0%	1	1	0	4706	18824	0%
Kinnaird Street	Howard Street	Cambridge	2	0%	1	1	0	4706	18824	0%
Kinnaird Street	Bay Street	Cambridge	2	0%	1	1	0	4706	18824	0%
Mount Auburn Street	Prentiss Street	Watertown	22	5%	1	1	275	149	18656	0%
Main Street	Pleasant Street	Waltham	33	7%	1	1	0	274	18084	0%
Hancock Street	Hodges Court	Quincy	24	5%	1	1	372	0	17856	0%
Massachusetts Avenue	Churchill Avenue	Cambridge	24	5%	1	0	0	733	17592	0%

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Mcgrath Highway	Newcomb Street	Quincy	25	5%	1	1	344	0	17200	0%
West Squantum Street	Newport Avenue	Quincy	23	5%	1	1	372	0	17112	0%
Broadway	Grove Street	Chelsea	2	0%	1	1	4074	168	16968	0%
Massachusetts Avenue	Clarendon Avenue	Cambridge	23	5%	1	0	0	733	16859	0%
Hodges Avenue	Hollis Avenue	Quincy	22	5%	1	1	372	0	16368	0%
Eden Street	Blossom Street	Chelsea	2	0%	1	1	4074	0	16296	0%
Chester Avenue	Shurtleff Street	Chelsea	2	0%	1	1	4074	0	16296	0%
Orange Street	Spruce Street	Chelsea	2	0%	1	1	4074	0	16296	0%
Spruce Street		Chelsea	2	0%	1	1	4074	0	16296	0%
Washington Avenue	Sagamore Avenue	Chelsea	29	6%	1	1	280	0	16240	0%
Summer Street	Quincy Street	Somerville	45	10%	1	1	0	174	15660	0%
Somerville Avenue	Bow Street	Somerville	23	5%	1	1	0	339	15594	0%
Essex Street	Tilton Terrace	Lynn	4	1%	1	1	1946	0	15568	0%
Cambridge Street	Fayette Street	Cambridge	4	1%	0	1	802	3083	15540	0%
Norfolk Street	Cambridge Street	Cambridge	2	0%	1	1	802	3083	15540	0%
Bridge Street	Ramp-Rt 107 Sb To Rt 114 Wb	Salem	48	10%	0	1	322	0	15456	0%
South Common Street	South Hannify Square	Lynn	26	6%	1	1	296	0	15392	0%
Bell Circle	Veterans Of Foreign Wars Parkway	Revere	22	5%	1	1	339	0	14916	0%
Somerville Avenue	Church Street	Somerville	22	5%	1	1	0	339	14916	0%
Parkman Street	Saint Paul Street	Brookline	43	9%	1	1	0	172	14792	0%
Warren Street	George Street	Lynn	23	5%	1	1	321	0	14766	0%
South Street		Lynn	23	5%	1	1	321	0	14766	0%
Second Street	Cambridge Street	Cambridge	23	5%	1	0	639	0	14697	0%
Revere Street	Harvard Street	Winthrop	68	14%	0	1	216	0	14688	0%
Staniford Street	Merrimac Street	Boston	42	9%	1	0	344	0	14448	0%
Moody Street	Myrtle Street	Waltham	22	5%	1	1	322	0	14168	0%
Moody Street	Ash Street	Waltham	22	5%	1	1	322	0	14168	0%
Stewart Street	James Street	Lynn	2	0%	1	1	3235	304	14156	0%
Summer Street	Chadwell Court	Lynn	22	5%	1	1	321	0	14124	0%
South Street	Hobson Street	Lynn	22	5%	1	1	321	0	14124	0%
Longwood Avenue	Kent Street	Brookline	28	6%	1	1	0	252	14112	0%
Hanover Street	Johnson Street	Lynn	23	5%	1	1	304	0	13984	0%
Walnut Street	High Street	Brookline	23	5%	1	1	0	304	13984	0%
Washington Street	Malcolm X Boulevard	Boston	25	5%	1	1	277	0	13850	0%
South Common Street	South Hannify Square	Lynn	23	5%	1	1	296	0	13616	0%
Broad Street	Dexter Street	Lynn	24	5%	1	1	278	0	13344	0%
Sudbury Street	Congress Street	Boston	22	5%	1	1	303	0	13332	0%
Chestnut Street	Jefferson Street	Lynn	26	6%	1	1	256	0	13312	0%
Massachusetts Avenue	Wendell Street	Cambridge	6	1%	1	0	0	2210	13260	0%
Washington Street	State Street	Boston	22	5%	1	1	300	0	13200	0%
Broadway		Chelsea	22	5%	1	1	297	0	13068	0%

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Leo M Birmingham Parkway	Ramp-Western Ave To Soldiers Field Rd Eb	Boston	28	6%	1	1	0	233	13048	0%
North Common Street	Baker Street	Lynn	22	5%	1	1	296	0	13024	0%
Beacon Street	Chestnut Street	Chelsea	22	5%	1	1	296	0	13024	0%
Pleasant Street	Bond Street	Lynn	22	5%	1	1	296	0	13024	0%
Brighton Avenue	Allston Street	Boston	25	5%	1	1	0	259	12950	0%
Beacon Hill Avenue	Beede Avenue	Lynn	2	0%	1	1	3235	0	12940	0%
Henry Avenue	Beede Avenue	Lynn	2	0%	1	1	3235	0	12940	0%
High Rock Street	Grover Street	Lynn	2	0%	1	1	3235	0	12940	0%
Rogers Avenue		Lynn	2	0%	1	1	3235	0	12940	0%
Cambridge Street	Irving Street	Boston	42	9%	1	1	0	151	12684	0%
Main Street		Waltham	23	5%	1	1	0	274	12604	0%
Main Street	Cross Street	Waltham	23	5%	1	1	0	274	12604	0%
Broadway	Norwood Street	Everett	27	6%	1	1	230	0	12420	0%
Hancock Street	Maple Street	Quincy	4	1%	1	1	1549	0	12392	0%
Norfolk Street	Hampshire Street	Cambridge	2	0%	1	1	0	3083	12332	0%
Beacon Street	Durham Street	Somerville	2	0%	1	1	0	3083	12332	0%
Lincoln Street	Windsor Street	Cambridge	2	0%	1	1	0	3083	12332	0%
Webster Avenue	Willow Street	Cambridge	2	0%	1	1	0	3083	12332	0%
Hancock Street	Franklin Street	Chelsea	22	5%	1	1	280	0	12320	0%
Revere Street	Broadway	Revere	24	5%	1	1	254	0	12192	0%
Medford Veterans Memorial Highway		Medford	22	5%	1	1	276	0	12144	0%
Blue Hill Avenue	Morton Street	Boston	28	6%	1	1	216	0	12096	0%
Lyman Street	School Street	Waltham	22	5%	1	1	0	274	12056	0%
West Central Street	Newfield Drive	Natick	71	15%	1	0	0	169	11999	0%
Brighton Avenue	Cambridge Street	Boston	23	5%	1	1	0	259	11914	0%
Beacon Street	Winchester Street	Brookline	24	5%	0	1	0	496	11904	0%
Beacon Street	Centre Street	Brookline	24	5%	0	1	0	496	11904	0%
West Central Street	Boden Lane	Natick	70	15%	1	0	0	169	11830	0%
Commonwealth Avenue	Pleasant Street	Boston,Brookline	23	5%	1	1	0	257	11822	0%
Burrus Square	Fayette Street	Lynn	23	5%	1	1	256	0	11776	0%
North Shore Road	Centennial Avenue	Revere	23	5%	1	1	255	0	11730	0%
Webster Avenue	Columbia Street	Somerville	25	5%	1	1	0	234	11700	0%
Chestnut Street	Story Avenue	Lynn	3	1%	1	1	1946	0	11676	0%
Cambridge Street	Hampshire Street	Cambridge	3	1%	0	1	802	3083	11655	0%
Beacon Street	Kent Street	Somerville	23	5%	1	1	0	253	11638	0%
Broadway	Corey Street	Everett	25	5%	1	1	230	0	11500	0%
Main Street	Winthrop Street	Winthrop	53	11%	0	1	216	0	11448	0%
Norfolk Street	Washington Street	Cambridge	3	1%	1	1	1895	0	11370	0%
Main Street	Court Street	Milford	22	5%	1	1	257	0	11308	0%
Broadway	Coolidge Street	Revere	22	5%	1	1	254	0	11176	0%

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TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Broadway	Hancock Street	Everett	24	5%	1	1	230	0	11040	0%
Main Street	Ferry Street	Malden	11	2%	1	1	500	0	11000	0%
Concord Street	Union Avenue	Framingham	6	1%	1	1	914	0	10968	0%
John F Fitzgerald Expressway	North Washington Street	Boston	23	5%	1	1	238	0	10948	0%
Williams Street	Centre Street	Brookline	22	5%	0	1	0	496	10912	0%
Commercial Street	Exchange Street	Malden	23	5%	1	1	235	0	10810	0%
Main Street	Spring Street	Waltham	25	5%	1	1	0	215	10750	0%
Bellingham Street	Highland Street	Chelsea	23	5%	1	1	231	0	10626	0%
Broadway	Ellsworth Street	Everett	23	5%	1	1	230	0	10580	0%
Fenway	Boylston Street	Boston	24	5%	1	1	215	0	10320	0%
Waverly Street	Bridges Street	Framingham	24	5%	1	1	215	0	10320	0%
Washburn Avenue	Winthrop Avenue	Revere	22	5%	1	1	232	0	10208	0%
Essex Street	Bessom Street	Lynn	23	5%	1	1	215	0	9890	0%
Massachusetts Avenue		Cambridge	5	1%	1	1	0	974	9740	0%
Boylston Street	Massachusetts Turnpike	Boston	22	5%	1	1	215	0	9460	0%
Main Street	Exchange Street	Waltham	22	5%	1	1	0	215	9460	0%
Washington Street	Foster Street	Quincy	3	1%	1	1	1549	0	9294	0%
Washington Street	Hanson Street	Somerville	3	1%	0	1	0	3083	9249	0%
Hollis Street	Hollis Court	Framingham	5	1%	1	1	914	0	9140	0%
Broadway	Prescott Street	Cambridge	5	1%	1	1	385	519	9040	0%
Massachusetts Avenue	Dunster Street	Cambridge	2	0%	1	1	1224	974	8792	0%
West Central Street	Kendall Lane	Natick	51	11%	1	0	0	169	8619	0%
Mcgrath Highway	Brackett Street	Quincy	25	5%	0	1	344	0	8600	0%
Monsignor Obrien Highway		Cambridge	22	5%	1	1	0	192	8448	0%
Ames Street	Main Street	Cambridge	24	5%	1	1	0	171	8208	0%
Beacon Street	Saint Paul Street	Brookline	23	5%	1	1	0	172	7912	0%
Sea Street	Coddington Street	Quincy	8	2%	1	1	490	0	7840	0%
Cambridge Street		Cambridge	4	1%	1	1	0	974	7792	0%
Essex Street	Mount Pleasant Street	Lynn	2	0%	1	1	1946	0	7784	0%
Chestnut Street	Olive Street	Lynn	2	0%	1	1	1946	0	7784	0%
Fayette Street	Williams Avenue	Lynn	2	0%	1	1	1946	0	7784	0%
Bridge Street		Salem	24	5%	0	1	322	0	7728	0%
Summer Street	Bow Street	Somerville	22	5%	1	1	0	174	7656	0%
Washington Street	Andem Place	Brookline	25	5%	0	1	0	304	7600	0%
Beacon Street	Kent Street	Brookline	44	9%	0	1	0	172	7568	0%
North Washington Street		Boston	22	5%	0	1	344	0	7568	0%
Park Drive		Boston	22	5%	1	1	0	169	7436	0%
Old Colony Avenue	Columbia Road	Boston	6	1%	1	1	383	233	7392	0%
Massachusetts Avenue	Bow Street	Cambridge	3	1%	1	1	1224	0	7344	0%
Concord Street		Framingham	4	1%	1	1	914	0	7312	0%
Powell Street	Beacon Street	Brookline	42	9%	0	1	0	172	7224	0%

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TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Harvard Street	Williams Street	Brookline	23	5%	0	1	0	300	6900	0%
River Street	Blackstone Street	Cambridge	23	5%	1	1	0	149	6854	0%
Temple Street	Heath Street	Somerville	7	1%	1	1	486	0	6804	0%
Broadway	Elm Street	Cambridge	2	0%	1	1	0	1696	6784	0%
Ramp-Sumner Tunl To Rt 3 Nb (Storrow Dr)	Cross Street	Boston	22	5%	0	1	303	0	6666	0%
Washington Street	Harbor Street	Salem	3	1%	1	1	843	261	6624	0%
Mount Auburn Street	Brattle Square	Cambridge	3	1%	1	0	1224	974	6594	0%
Fellsway	Middlesex Avenue	Medford	23	5%	1	0	276	0	6348	0%
Cambridge Street	Staniford Street	Boston	42	9%	1	0	0	151	6342	0%
Coddington Street	Faxon Avenue	Quincy	2	0%	1	1	1549	0	6196	0%
Dummer Street	Amory Street	Brookline	23	5%	0	1	0	257	5911	0%
Harvey Street	Cedar Street	Cambridge	4	1%	1	1	0	733	5864	0%
Endicott Street	Pratt Street	Salem	22	5%	0	1	0	261	5742	0%
Brattle Street	Mason Street	Cambridge	24	5%	1	0	0	236	5664	0%
Beacon Street	Massachusetts Avenue	Boston	5	1%	1	1	0	561	5610	0%
New Chardon Street	Canal Street	Boston	22	5%	1	0	238	0	5236	0%
Ash Street	Mount Auburn Street	Cambridge	22	5%	1	0	0	236	5192	0%
Revere Street	Taylor Street	Winthrop	23	5%	0	1	216	0	4968	0%
Mount Auburn Street	University Road	Cambridge	4	1%	1	0	1224	0	4896	0%
Broadway	Liberty Avenue	Somerville	23	5%	0	1	0	211	4853	0%
Revere Street	Shirley Street	Winthrop	22	5%	0	1	216	0	4752	0%
Somerville Avenue	Properzi Way	Somerville	4	1%	1	1	0	584	4672	0%
Milk Street	Sewall Place	Boston	2	0%	1	1	1166	0	4664	0%
School Street	Phipps Street	Quincy	3	1%	0	1	1549	0	4647	0%
Broadway	Chandler Street	Somerville	22	5%	0	1	0	211	4642	0%
Main Street	Weston Street	Waltham	3	1%	1	1	764	0	4584	0%
Mount Auburn Street	Mifflin Place	Cambridge	2	0%	1	0	1224	974	4396	0%
Eliot Street	Bennett Street	Cambridge	2	0%	1	0	1224	974	4396	0%
Derby Street	Liberty Street	Salem	2	0%	1	1	843	170	4052	0%
Union Square	Bow Street	Somerville	2	0%	1	1	317	685	4008	0%
Washington Street	Kingman Road	Somerville	2	0%	1	1	317	685	4008	0%
Bow Street	Summer Street	Somerville	23	5%	0	1	0	174	4002	0%
Fellsway West	Fells Avenue	Medford	4	1%	1	1	488	0	3904	0%
Cambridge Street	First Street	Cambridge	6	1%	1	0	639	0	3834	0%
Beacon Street	Borland Street	Brookline	22	5%	0	1	0	172	3784	0%
Hancock Street	Chapman Street	Quincy	4	1%	1	1	469	0	3752	0%
Moody Street	Gordon Street	Waltham	4	1%	1	1	465	0	3720	0%
Chestnut Street	Moody Street	Waltham	4	1%	1	1	465	0	3720	0%
Riverway	Park Drive	Boston	22	5%	0	1	0	169	3718	0%
Western Avenue	Whiting Street	Lynn	3	1%	1	1	614	0	3684	0%
Waverly Street		Framingham	2	0%	1	1	914	0	3656	0%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Trowbridge Street	Broadway	Cambridge	4	1%	1	1	0	456	3648	0%
North Common Street	South Common Street	Lynn	4	1%	1	1	429	0	3432	0%
Broadway	Hancock Street	Cambridge	2	0%	0	1	0	1696	3392	0%
Hancock Street	Hayward Street	Quincy	6	1%	1	1	277	0	3324	0%
Margin Street	Gedney Street	Salem	3	1%	0	1	843	261	3312	0%
Eastern Avenue	Spencer Avenue	Chelsea	3	1%	1	1	533	0	3198	0%
Cambridge Street	Berkshire Street	Cambridge	2	0%	1	1	299	494	3172	0%
Elm Street	Music Hall Avenue	Waltham	2	0%	1	1	572	215	3148	0%
Granite Street	School Street	Quincy	2	0%	1	0	1549	0	3098	0%
Parking Way		Quincy	2	0%	0	1	1549	0	3098	0%
Ross Way		Quincy	2	0%	0	1	1549	0	3098	0%
Main Street	Weston Street	Waltham	2	0%	1	1	764	0	3056	0%
Main Street	Exchange Street	Malden	3	1%	1	1	500	0	3000	0%
West Squantum Street	Fayette Street	Quincy	4	1%	1	1	372	0	2976	0%
Broadway	Wheatland Street	Somerville	3	1%	1	1	486	0	2916	0%
Hancock Street	Blake Street	Quincy	3	1%	1	1	469	0	2814	0%
Hancock Street	Glover Avenue	Quincy	5	1%	1	1	277	0	2770	0%
Broadway	Proctor Avenue	Revere	2	0%	1	1	689	0	2756	0%
Main Street	Harris Street	Waltham	5	1%	1	1	0	274	2740	0%
Robbins Street	Moody Street	Waltham	4	1%	1	1	322	0	2576	0%
Gore Street	Seventh Street	Cambridge	2	0%	1	1	639	0	2556	0%
Monsignor Obrien Highway	Cambridge Street	Cambridge	2	0%	1	1	639	0	2556	0%
Main Street	Eagan Place	Peabody	5	1%	1	1	253	0	2530	0%
Summer Street	Gedney Street	Salem	3	1%	0	1	843	0	2529	0%
Franklin Street		Lynn	2	0%	1	1	614	0	2456	0%
Laighton Street	Johnson Street	Lynn	2	0%	1	1	614	0	2456	0%
Broadway	Crescent Avenue	Chelsea	4	1%	1	1	297	0	2376	0%
Columbia Road	General Casimir Pulaski Skyway	Boston	3	1%	1	1	383	0	2298	0%
Charles Street	Mechanic Street	Waltham	2	0%	1	1	572	0	2288	0%
Hancock Street		Quincy	3	1%	1	1	372	0	2232	0%
Washington Street	Barton Square	Salem	2	0%	0	1	843	261	2208	0%
Washington Street	Front Street	Salem	2	0%	0	1	843	261	2208	0%
Webster Avenue	Dudley Street	Chelsea	2	0%	1	1	533	0	2132	0%
Washington Street	Bigelow Street	Quincy	3	1%	1	1	344	0	2064	0%
Main Street	Pearl Street	Milford	4	1%	1	1	257	0	2056	0%
Shirley Avenue	North Shore Road	Revere	4	1%	1	1	255	0	2040	0%
Revere Beach Boulevard		Revere	4	1%	1	1	255	0	2040	0%
Pleasant Street	Dartmouth Street	Malden	2	0%	1	1	500	0	2000	0%
Massachusetts Avenue	Magoun Street	Cambridge	3	1%	1	0	0	658	1974	0%
Southern Artery	Sea Street	Quincy	4	1%	0	1	490	0	1960	0%
Heath Street	Langmaid Avenue	Somerville	2	0%	1	1	486	0	1944	0%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Main Street	Albany Street	Cambridge	3	1%	1	1	0	321	1926	0%
Albany Street	Northampton Street	Boston	2	0%	1	1	474	0	1896	0%
Cambridge Street	Dana Street	Cambridge	2	0%	0	1	385	519	1808	0%
School Street	Spruce Street	Milford	7	1%	0	1	257	0	1799	0%
Eleanor Street	Spencer Avenue	Chelsea	3	1%	1	1	297	0	1782	0%
Clark Avenue	Parker Street	Chelsea	3	1%	1	1	297	0	1782	0%
Mount Auburn Street	Bigelow Avenue	Watertown	4	1%	0	1	275	149	1696	0%
Revere Beach Parkway		Medford	6	1%	1	0	276	0	1656	0%
Newton Street	Barton Street	Waltham	3	1%	1	1	0	274	1644	0%
Fayette Street	Marianna Street	Lynn	3	1%	1	1	256	0	1536	0%
West Squantum Street	Safford Street	Quincy	2	0%	1	1	372	0	1488	0%
Commercial Street		Malden	3	1%	1	1	235	0	1410	0%
Lewis Street	Basset Street	Lynn	3	1%	1	1	234	0	1404	0%
Garden Street		Cambridge	5	1%	1	0	0	279	1395	0%
Washington Street	Edwards Street	Quincy	2	0%	1	1	344	0	1376	0%
Mcgrath Highway	Spear Street	Quincy	2	0%	1	1	344	0	1376	0%
Broadway	Autumn Street	Somerville	2	0%	1	1	339	0	1356	0%
Empire Street	Timson Street	Lynn	3	1%	1	1	215	0	1290	0%
Alder Street	Beech Street	Waltham	2	0%	1	1	322	0	1288	0%
Commercial Street	Summer Street	Lynn	2	0%	1	1	321	0	1284	0%
Hanover Street	Chase Street	Lynn	2	0%	1	1	304	0	1216	0%
Chase Street		Lynn	2	0%	1	1	304	0	1216	0%
Baker Street	Chase Street	Lynn	2	0%	1	1	304	0	1216	0%
Johnson Street	Henry Avenue	Lynn	2	0%	1	1	304	0	1216	0%
Washington Street	Juniper Street	Brookline	2	0%	1	1	0	304	1216	0%
Cross Street	Ramp-Sumner Tuni To Rt 3 Nb (Storrow Dr)	Boston	2	0%	1	1	303	0	1212	0%
Pacific Street	Sidney Street	Cambridge	4	1%	1	1	0	150	1200	0%
Congress Street	State Street	Boston	2	0%	1	1	300	0	1200	0%
Putnam Avenue	Pleasant Street	Cambridge	4	1%	1	1	0	149	1192	0%
Cary Avenue	Clark Avenue	Chelsea	2	0%	1	1	297	0	1188	0%
Spencer Avenue	Vernon Street	Chelsea	2	0%	1	1	297	0	1188	0%
Washington Street	Lynde Street	Salem	2	0%	0	1	322	261	1166	0%
Stuart Street	Tremont Street	Boston	2	0%	1	1	280	0	1120	0%
Washington Avenue	Hancock Street	Chelsea	2	0%	1	1	280	0	1120	0%
Broad Street	Estes Street	Lynn	2	0%	1	1	278	0	1112	0%
Hancock Street	Burgess Street	Quincy	2	0%	1	1	277	0	1108	0%
Mount Auburn Street	Lloyd Road	Watertown	4	1%	0	1	275	0	1100	0%
Commonwealth Avenue	Commonwealth Avenue Frontage Road Eb	Boston	2	0%	1	1	0	258	1032	0%
Chestnut Street	Logan Street	Lynn	2	0%	1	1	256	0	1024	0%
Revere Beach Boulevard		Revere	2	0%	1	1	255	0	1020	0%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Main Street		Peabody	2	0%	1	1	253	0	1012	0%
Beacon Street	Marion Street	Brookline	2	0%	0	1	0	496	992	0%
Centre Street	Shailer Street	Brookline	2	0%	0	1	0	496	992	0%
Warren Avenue	Sanborn Avenue	Somerville	2	0%	0	1	317	174	982	0%
Honorable Thomas S Burgin Parkway	Granite Street	Quincy	3	1%	0	1	320	0	960	0%
Pleasant Street	Commercial Street	Malden	2	0%	1	1	235	0	940	0%
Lewis Street	Burrill Avenue	Lynn	2	0%	1	1	234	0	936	0%
Prospect Street	Webster Avenue	Somerville	2	0%	1	1	0	234	936	0%
Leo M Birmingham Parkway		Boston	2	0%	1	1	0	233	932	0%
Bennington Street	Winthrop Avenue	Revere	2	0%	1	1	232	0	928	0%
Chelsea Street	Victoria Street	Everett	2	0%	1	1	230	0	920	0%
Second Street	Revere Street	Everett	2	0%	1	1	230	0	920	0%
Eastern Avenue	Timson Street	Lynn	2	0%	1	1	215	0	860	0%
Eastern Avenue	Williams Avenue	Lynn	2	0%	1	1	215	0	860	0%
Eastern Avenue	Sheldon Street	Lynn	2	0%	1	1	215	0	860	0%
Pearl Street	Granite Street	Milford	3	1%	0	1	257	0	771	0%
Monsignor Obrien Highway		Cambridge	2	0%	1	1	0	192	768	0%
Powder House Square	Powder House Boulevard	Somerville	3	1%	0	1	0	211	633	0%
Harvard Street	Kent Street	Brookline	2	0%	0	1	0	304	608	0%
Linden Place	Linden Court	Brookline	2	0%	0	1	0	304	608	0%
Atlantic Street	Baltimore Street	Lynn	2	0%	0	1	278	0	556	0%
Bigelow Avenue	Merrifield Avenue	Watertown	2	0%	0	1	275	0	550	0%
Merrimac Street	New Chardon Street	Boston	2	0%	1	0	238	0	476	0%
Mason Street	Phillips Place	Cambridge	2	0%	1	0	0	236	472	0%
Elm Street	Linden Avenue	Somerville	2	0%	0	1	0	235	470	0%
Somerville Avenue	White Street	Cambridge	46	10%	0	0	362	2210	0	0%
	Galen Street	Watertown	248	53%	0	0	928	0	0	0%
Massachusetts Avenue	Creighton Street	Cambridge	44	9%	0	0	362	2210	0	0%
Mystic Street	Massachusetts Avenue	Arlington	158	34%	0	0	435	152	0	0%
Spring Street	Summer Street	Watertown	167	36%	0	0	928	0	0	0%
Granite Street	Access Road	Quincy	99	21%	0	0	1549	0	0	0%
South Main Street	East Central Street	Natick	118	25%	0	0	485	152	0	0%
Massachusetts Avenue	Cogswell Avenue	Cambridge	66	14%	0	0	0	2210	0	0%
Beacon Street	Centre Street	Newton	55	12%	0	0	805	431	0	0%
Highland Avenue	College Avenue	Somerville	52	11%	0	0	1046	215	0	0%
Massachusetts Avenue	Somerville Avenue	Cambridge	25	5%	0	0	362	2210	0	0%
Massachusetts Avenue	Davenport Street	Cambridge	25	5%	0	0	362	2210	0	0%
Massachusetts Avenue	Porter Road	Cambridge	23	5%	0	0	362	2210	0	0%
Massachusetts Avenue	Upland Road	Cambridge	23	5%	0	0	362	2210	0	0%
Main Street	Winn Street	Woburn	245	52%	0	0	476	0	0	0%

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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Elm Street	Grove Street	Somerville	44	9%	0	0	1046	215	0	0%
Massachusetts Avenue	Rindge Avenue	Cambridge	47	10%	0	0	0	2210	0	0%
Massachusetts Avenue	Garfield Street	Cambridge	46	10%	0	0	0	2210	0	0%
Massachusetts Avenue	Linnaean Street	Cambridge	46	10%	0	0	0	2210	0	0%
Massachusetts Avenue	Roseland Street	Cambridge	45	10%	0	0	0	2210	0	0%
Cross Street	Main Street	Watertown	90	19%	0	0	928	0	0	0%
Main Street	Liberty Square	Weymouth	311	66%	0	0	252	0	0	0%
South Main Street	Pond Street	Natick	59	13%	0	0	485	152	0	0%
Main Street	Mystic Valley Parkway	Medford	302	64%	0	0	238	0	0	0%
Highland Avenue	Ellington Road	Somerville	27	6%	0	0	1046	215	0	0%
Grove Street	Highland Avenue	Somerville	26	6%	0	0	1046	215	0	0%
East Central Street	Washington Street	Natick	51	11%	0	0	485	152	0	0%
Centre Street	Cypress Street	Newton	26	6%	0	0	805	431	0	0%
Massachusetts Avenue	Hollis Street	Cambridge	85	18%	0	0	0	733	0	0%
Centre Street	Langley Road	Newton	24	5%	0	0	805	431	0	0%
Davis Square	Elm Street	Somerville	23	5%	0	0	1046	215	0	0%
Massachusetts Avenue	Walden Street	Cambridge	26	6%	0	0	0	2210	0	0%
Main Street	South Avenue	Natick	44	9%	0	0	485	152	0	0%
Holland Street	Jay Street	Somerville	23	5%	0	0	1046	172	0	0%
Cutter Avenue	Summer Street	Somerville	22	5%	0	0	1046	215	0	0%
Elm Street	Cutter Avenue	Somerville,Cambridge	22	5%	0	0	1046	215	0	0%
College Avenue	Morrison Avenue	Somerville	23	5%	0	0	1046	153	0	0%
South Main Street	Common Street	Natick	43	9%	0	0	485	152	0	0%
Beacon Street	Union Street	Newton	22	5%	0	0	805	431	0	0%
Centre Street	Lyman Street	Newton	66	14%	0	0	805	0	0	0%
Third Street	Gore Street	Cambridge	77	16%	0	0	639	0	0	0%
Main Street	Church Street	Watertown	47	10%	0	0	928	0	0	0%
Centre Street	Pleasant Street	Newton	53	11%	0	0	805	0	0	0%
	Waterhouse Street	Cambridge	43	9%	0	0	0	974	0	0%
Atlantic Avenue	Summer Street	Boston	22	5%	0	0	1899	0	0	0%
Massachusetts Avenue	Fairmont Street	Arlington	63	13%	0	0	0	658	0	0%
Mount Auburn Street	Summer Street	Watertown	44	9%	0	0	928	0	0	0%
Walnut Street	Washington Street	Newton	95	20%	0	0	426	0	0	0%
Washington Street	Watertown Street	Newton	92	20%	0	0	401	0	0	0%
Mystic Street	Winslow Street	Arlington	30	6%	0	0	435	152	0	0%
Massachusetts Avenue	Mill Street	Arlington	77	16%	0	0	435	0	0	0%
Massachusetts Avenue	Grafton Street	Arlington	50	11%	0	0	0	658	0	0%
Massachusetts Avenue	Dudley Street	Cambridge	44	9%	0	0	0	733	0	0%
Main Street	Summer Street	Natick	24	5%	0	0	485	152	0	0%
Massachusetts Avenue	Library Way	Arlington	25	5%	0	0	435	152	0	0%
Massachusetts Avenue	Muzzey Street	Lexington	26	6%	0	0	365	191	0	0%
Massachusetts Avenue	Egerton Road	Arlington	43	9%	0	0	0	658	0	0%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Massachusetts Avenue	Windsor Street	Arlington	43	9%	0	0	0	658	0	0%
Main Street		Natick	22	5%	0	0	485	152	0	0%
Massachusetts Avenue	Railroad Avenue	Arlington	22	5%	0	0	435	152	0	0%
Massachusetts Avenue	Depot Square	Lexington	22	5%	0	0	365	191	0	0%
North Beacon Street	Charles River Road	Watertown	25	5%	0	0	928	0	0	0%
Main Street	Walnut Street	Woburn	47	10%	0	0	476	0	0	0%
Massachusetts Avenue	Lake Street	Arlington	33	7%	0	0	0	658	0	0%
Church Street		Watertown	23	5%	0	0	928	0	0	0%
Centre Street	Tyler Terrace	Newton	26	6%	0	0	805	0	0	0%
Main Street	Campbell Street	Woburn	42	9%	0	0	476	0	0	0%
Beacon Street	Grant Avenue	Newton	46	10%	0	0	0	431	0	0%
Main Street	Water Street	Wakefield	49	10%	0	0	403	0	0	0%
Washington Street	Elm Street	Newton	47	10%	0	0	401	0	0	0%
Main Street	High Street	Medford	75	16%	0	0	238	0	0	0%
Main Street	Albion Street	Wakefield	44	9%	0	0	403	0	0	0%
Highland Street	Davis Street	Newton	43	9%	0	0	401	0	0	0%
Massachusetts Avenue	Linwood Street	Arlington	25	5%	0	0	0	658	0	0%
Massachusetts Avenue	Beech Street	Cambridge	3	1%	0	0	362	2210	0	0%
Melrose Street	Lynn Fells Parkway	Melrose	103	22%	0	0	0	149	0	0%
Main Street	Central Street	Stoneham	48	10%	0	0	317	0	0	0%
Massachusetts Avenue	Amsden Street	Arlington	22	5%	0	0	0	658	0	0%
Lynn Fells Parkway	Main Street	Melrose	97	21%	0	0	0	149	0	0%
East Central Street	Lincoln Street	Natick	29	6%	0	0	485	0	0	0%
Highland Avenue	Central Street	Somerville	45	10%	0	0	296	0	0	0%
Washington Street	Holden Street	Brookline	43	9%	0	0	0	304	0	0%
Beacon Street	Winthrop Road	Brookline	46	10%	0	0	0	279	0	0%
Washington Street	Beacon Street	Brookline	45	10%	0	0	0	279	0	0%
Main Street	Common Street	Woburn	25	5%	0	0	476	0	0	0%
Main Street	Salem Street	Woburn	25	5%	0	0	476	0	0	0%
Massachusetts Avenue	Bartlett Avenue	Arlington	27	6%	0	0	435	0	0	0%
Main Street	Crescent Street	Wakefield	29	6%	0	0	403	0	0	0%
East Central Street	Mulligan Street	Natick	24	5%	0	0	485	0	0	0%
Cypress Street	Braeland Avenue	Newton	27	6%	0	0	0	431	0	0%
Pleasant Street	Abbott Street	Woburn	24	5%	0	0	476	0	0	0%
Walnut Street	Austin Street	Newton	26	6%	0	0	426	0	0	0%
Common Street		Woburn	23	5%	0	0	476	0	0	0%
Washington Street	Cherry Street	Newton	27	6%	0	0	401	0	0	0%
Beacon Street	Langley Road	Newton	25	5%	0	0	0	431	0	0%
North Avenue	Washington Street	Natick	22	5%	0	0	485	0	0	0%
Beacon Street	Walnut Street	Newton	46	10%	0	0	0	231	0	0%
Main Street	Lincoln Street	Wakefield	26	6%	0	0	403	0	0	0%
Water Street	Crescent Street	Wakefield	26	6%	0	0	403	0	0	0%

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TABLE 1
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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Main Street		Medford	44	9%	0	0	238	0	0	0%
Main Street	Mystic Valley I-93 Connector	Medford	44	9%	0	0	238	0	0	0%
Green Street	Lynn Fells Parkway	Melrose	70	15%	0	0	0	149	0	0%
Washington Street	Chestnut Street	Newton	26	6%	0	0	401	0	0	0%
College Avenue	Kidder Avenue	Somerville	65	14%	0	0	0	153	0	0%
Walnut Street	Otis Street	Newton	23	5%	0	0	426	0	0	0%
Washington Street	Central Avenue	Newton	23	5%	0	0	426	0	0	0%
Main Street	Chestnut Street	Wakefield	24	5%	0	0	403	0	0	0%
Washington Street	Highland Street	Newton	24	5%	0	0	401	0	0	0%
Main Street	Maple Street	Stoneham	26	6%	0	0	317	0	0	0%
		Chelsea	2	0%	0	0	4074	0	0	0%
Massachusetts Avenue	Edison Way	Lexington	22	5%	0	0	365	0	0	0%
South Main Street	Cottage Street	Natick	6	1%	0	0	485	152	0	0%
Front Street	West Street	Weymouth	29	6%	0	0	252	0	0	0%
Holland Street	Paulina Street	Somerville	3	1%	0	0	1046	172	0	0%
Washington Street	Thayer Street	Brookline	24	5%	0	0	0	304	0	0%
Highland Avenue	Benton Road	Somerville	24	5%	0	0	296	0	0	0%
Main Street	Common Street	Stoneham	22	5%	0	0	317	0	0	0%
Massachusetts Avenue	Meriam Street	Lexington	6	1%	0	0	365	191	0	0%
Harvard Street	Columbia Street	Brookline	22	5%	0	0	0	300	0	0%
Beacon Street	Washington Street	Brookline	23	5%	0	0	0	279	0	0%
Charles Street	Charles Street Circle	Boston	23	5%	0	0	259	0	0	0%
Massachusetts Avenue	Bedford Street	Lexington	5	1%	0	0	365	191	0	0%
Governors Avenue	High Street	Medford	23	5%	0	0	238	0	0	0%
Salem Street	River Street	Medford	23	5%	0	0	238	0	0	0%
Riverside Avenue	City Hall Mall	Medford	22	5%	0	0	238	0	0	0%
Brattle Street		Cambridge	22	5%	0	0	0	236	0	0%
Beacon Street	Garland Road	Newton	22	5%	0	0	0	231	0	0%
Walnut Street	Beacon Street	Newton	22	5%	0	0	0	231	0	0%
Granite Street		Quincy	3	1%	0	0	1549	0	0	0%
Massachusetts Avenue	Marion Road	Arlington	7	1%	0	0	0	658	0	0%
East Central Street		Natick	3	1%	0	0	485	152	0	0%
Main Street	Short Street	Melrose	22	5%	0	0	0	149	0	0%
Union Street	Langley Road	Newton	7	1%	0	0	0	431	0	0%
Main Street		Watertown	3	1%	0	0	928	0	0	0%
Mount Auburn Street		Watertown	3	1%	0	0	928	0	0	0%
Arsenal Street	North Beacon Street	Watertown	3	1%	0	0	928	0	0	0%
Massachusetts Avenue	Cleveland Street	Arlington	4	1%	0	0	0	658	0	0%
Massachusetts Avenue	Waltham Street	Lexington	7	1%	0	0	365	0	0	0%
Mount Vernon Street		Boston	2	0%	0	0	383	233	0	0%
Massachusetts Avenue	Swan Place	Arlington	2	0%	0	0	435	152	0	0%
Pleasant Street	Swan Street	Arlington	2	0%	0	0	435	152	0	0%

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TABLE 1
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Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Massachusetts Avenue	Grant Street	Lexington	6	1%	0	0	365	0	0	0%
Holland Street	Buena Vista Road	Somerville	2	0%	0	0	1046	0	0	0%
Meacham Road	Buena Vista Road	Somerville	2	0%	0	0	1046	0	0	0%
Main Street	Common Street	Woburn	4	1%	0	0	476	0	0	0%
Galen Street	Water Street	Watertown	2	0%	0	0	928	0	0	0%
Massachusetts Avenue	Academy Street	Arlington	4	1%	0	0	435	0	0	0%
Walnut Street	Washington Park	Newton	4	1%	0	0	426	0	0	0%
Main Street	Common Street	Wakefield	4	1%	0	0	403	0	0	0%
Centre Street		Newton	2	0%	0	0	805	0	0	0%
Massachusetts Avenue	Haskell Street	Cambridge	2	0%	0	0	0	733	0	0%
Massachusetts Avenue	Meacham Road	Cambridge	2	0%	0	0	0	733	0	0%
Massachusetts Avenue	Rice Street	Cambridge	2	0%	0	0	0	733	0	0%
Common Street	Church Street	Natick	3	1%	0	0	485	0	0	0%
Main Street	Middlesex Avenue	Natick	3	1%	0	0	485	0	0	0%
Washington Street	South Avenue	Natick	3	1%	0	0	485	0	0	0%
Walnut Street	Beacon Street	Newton	6	1%	0	0	0	231	0	0%
Massachusetts Avenue	Oxford Street	Arlington	2	0%	0	0	0	658	0	0%
Massachusetts Avenue	Everett Street	Arlington	2	0%	0	0	0	658	0	0%
Massachusetts Avenue	Marathon Street	Arlington	2	0%	0	0	0	658	0	0%
Massachusetts Avenue	Lafayette Street	Arlington	2	0%	0	0	0	658	0	0%
Mill Street	Mill Brook Drive	Arlington	3	1%	0	0	435	0	0	0%
Water Street		Wakefield	3	1%	0	0	403	0	0	0%
Fellsway	Medford Veterans Memorial Highway	Medford	4	1%	0	0	276	0	0	0%
Main Street	High Street	Woburn	2	0%	0	0	476	0	0	0%
Ramp-Main St To Rt 16 Wb/38 Nb	Connector Mystic Valley Parkway	Medford	4	1%	0	0	238	0	0	0%
Walnut Street	Carthay Circle	Newton	4	1%	0	0	0	231	0	0%
Massachusetts Avenue	Churchill Avenue	Arlington	2	0%	0	0	435	0	0	0%
Massachusetts Avenue		Arlington	2	0%	0	0	435	0	0	0%
Pearl Street	Glenwood Avenue	Cambridge	2	0%	0	0	0	426	0	0%
Garden Street	Concord Avenue	Cambridge	3	1%	0	0	0	279	0	0%
Crescent Street	Lincoln Street	Wakefield	2	0%	0	0	403	0	0	0%
Lincoln Street	Smith Street	Wakefield	2	0%	0	0	403	0	0	0%
Water Street	Wakefield Avenue	Wakefield	2	0%	0	0	403	0	0	0%
Water Street	Smith Street	Wakefield	2	0%	0	0	403	0	0	0%
Albion Street	Foster Street	Wakefield	2	0%	0	0	403	0	0	0%
Washington Street	Ramp-Rt 16 To Rt 90 Eb	Newton	2	0%	0	0	401	0	0	0%
Elm Street	Border Street	Newton	2	0%	0	0	401	0	0	0%
Chestnut Street	Plimpton Road	Newton	2	0%	0	0	401	0	0	0%
Mystic Street	Chestnut Street	Arlington	5	1%	0	0	0	152	0	0%
Main Street		Weymouth	3	1%	0	0	252	0	0	0%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

TABLE 1
Intersections and Level of Priority for Bicycle and Pedestrian Improvements by Location

Street #1	Street #2	Municipality	Intersection EPDO	Percent of Greatest EPDO	Minority	Low Income	Pedestrian Crash Cluster EPDO	Bicycle Crash Cluster EPDO	Prioritization Equation Total	Percent of Greatest Prioritization Equation Total
Massachusetts Avenue	Wallis Court	Lexington	2	0%	0	0	365	0	0	0%
	Mystic Valley Parkway	Medford	3	1%	0	0	238	0	0	0%
Main Street	Clippership Drive	Medford	3	1%	0	0	238	0	0	0%
Forest Street	Oxford Street	Cambridge	3	1%	0	0	0	235	0	0%
Holland Street	Cameron Avenue	Somerville	4	1%	0	0	0	172	0	0%
Harvard Street	Fuller Street	Brookline	2	0%	0	0	0	300	0	0%
Central Street	Hudson Street	Somerville	2	0%	0	0	296	0	0	0%
Concord Avenue	Craigie Street	Cambridge	2	0%	0	0	0	279	0	0%
Garden Street	Waterhouse Street	Cambridge	2	0%	0	0	0	279	0	0%
Cambridge Street	Charles Street Circle	Boston	2	0%	0	0	259	0	0	0%
Middle Street		Weymouth	2	0%	0	0	252	0	0	0%
Salem Street	Oakland Street	Medford	2	0%	0	0	238	0	0	0%
High Street		Medford	2	0%	0	0	238	0	0	0%
Brattle Street	Hawthorn Street	Cambridge	2	0%	0	0	0	236	0	0%
Walnut Street	Beacon Street	Newton	2	0%	0	0	0	231	0	0%
Massachusetts Avenue	Medford Street	Arlington	3	1%	0	0	0	152	0	0%
Massachusetts Avenue	Broadway	Arlington	2	0%	0	0	0	152	0	0%

Note: EPDO stands for Equivalent Property Damage Only, which is a crash severity rating.

Appendix B
Crash Data Summary Table

Crash Data Summary Table

Liberty Street and Washington Street, Lynn, MA

2013–17

Crash Diagram Reference Number	Crash Date	Crash Day	Crash Time of Day	Manner of Collision	Nonmotorist	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Injury Severity
1	02/06/13	Wednesday	6:43 AM	Angle collision with motor vehicle in traffic	No	Daylight	Snow	Snow	Disregarded traffic signs, signals, road markings	No injury
2	02/07/13	Thursday	2:43 PM	Angle collision with motor vehicle in traffic	No	Daylight	Sleet, hail (freezing rain or drizzle)	Wet	No improper driving	No injury
3	02/08/13	Friday	6:33 PM	Angle collision with motor vehicle in traffic	No	Dusk	Clear	Dry	No improper driving	No injury
4	02/09/13	Saturday	12:14 PM	Sideswipe, same direction (harmful event not reported)	No	Daylight	Clear	Dry	Inattention	Non-fatal injury
5	02/10/13	Sunday	3:24 AM	Rear-end collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Unknown	No injury
6	02/11/13	Monday	8:40 PM	Single vehicle collision with pedestrian	Pedestrian	Dark - lighted roadway	Rain	Wet	Visibility obstructed; Driving too fast for conditions	Non-fatal injury
7	02/12/13	Tuesday	8:03 AM	Not reported	Not reported	Daylight	Rain	Wet	Unknown	Not reported
8	02/13/13	Wednesday	7:32 AM	Not reported	Not reported	Daylight	Clear	Not reported	Unknown	Not reported
9	02/14/13	Thursday	5:39 AM	Rear-end collision with motor vehicle in traffic	No	Dark - lighted roadway	Cloudy	Wet	Other improper action	No injury
10	02/15/13	Friday	3:13 PM	Sideswipe collision with motor vehicle in traffic, same direction	No	Daylight	Cloudy	Dry	Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	No injury

Crash Diagram Reference Number	Crash Date	Crash Day	Crash Time of Day	Manner of Collision	Nonmotorist	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Injury Severity
11	02/16/13	Saturday	6:16 AM	Rear-end collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Other improper action	No injury
12	02/17/13	Sunday	6:50 AM	Single vehicle collision with pedestrian	Pedestrian	Daylight	Clear	Dry	Unknown	Possible non-fatal injury
14	02/18/13	Monday	8:02 AM	Angle collision with motor vehicle in traffic	No	Daylight	Clear	Dry	Failure to keep in proper lane or running off road	No injury
15	02/19/13	Tuesday	12:15 PM	Angle collision with pedestrian	Pedestrian	Daylight	Clear	Dry	No improper driving	No injury
16	02/20/13	Wednesday	3:38 PM	Collision with other movable object	Unknown	Daylight	Clear/Severe crosswinds	Dry	No improper driving	No injury
18	02/21/13	Thursday	7:27 AM	Single vehicle collision with pedestrian	Pedestrian	Daylight	Clear	Dry	No improper driving	No injury
19	02/22/13	Friday	8:01 PM	Rear-end collision (harmful event not reported)	No	Daylight	Clear	Dry	No improper driving	No injury
20	02/23/13	Saturday	6:42 PM	Angle collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Unknown	No injury
21	02/24/13	Sunday	3:10 PM	Angle collision with pedestrian	Pedestrian	Daylight	Clear	Dry	No improper driving	Non-fatal injury
22	02/25/13	Monday	2:46 PM	Rear-end collision with motor vehicle in traffic	No	Daylight	Clear	Dry	Unknown	No injury
23	02/26/13	Tuesday	11:00 AM	Angle collision with motor vehicle in traffic	No	Daylight	Clear	Dry	Unknown	No injury
24	02/27/13	Wednesday	1:09 AM	Head-on collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Unknown	Possible non-fatal injury
25	02/28/13	Thursday	6:01 PM	Rear-end collision with motor vehicle in traffic	No	Dusk	Sleet, hail (freezing rain or drizzle)	Wet	Other improper action	Non-fatal injury
26	03/01/13	Friday	12:22 PM	Rear-end collision with motor vehicle in traffic	No	Daylight	Snow	Snow	Followed too closely	No injury

Crash Diagram Reference Number	Crash Date	Crash Day	Crash Time of Day	Manner of Collision	Nonmotorist	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Injury Severity
27	03/02/13	Saturday	6:26 PM	Single vehicle collision with curb	No	Daylight	Clear	Dry	Unknown	No injury
28	03/03/13	Sunday	9:02 PM	Angle collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Unknown	Non-fatal injury
29	03/04/13	Monday	5:24 AM	Sideswipe collision with motor vehicle in traffic, opposite direction	No	Dark - lighted roadway	Rain	Wet	Unknown	Non-fatal injury
30	03/05/13	Tuesday	4:51 PM	Rear-end collision with motor vehicle in traffic	No	Dusk	Clear	Dry	Other improper action	No injury
31	03/06/13	Wednesday	9:51 PM	Rear-end collision with parked motor vehicle	No	Dark - lighted roadway	Clear	Dry	Unknown	Not reported
32	03/07/13	Thursday	9:00 PM	Single vehicle collision with pedestrian	Pedestrian	Dark - lighted roadway	Clear	Dry	Unknown	Possible non-fatal injury
33	03/08/13	Friday	8:10 AM	Sideswipe collision with motor vehicle in traffic, same direction	No	Daylight	Clear	Dry	Unknown	No injury
35	03/09/13	Saturday	1:33 AM	Sideswipe collision with motor vehicle in traffic, same direction	No	Dark - lighted roadway	Clear	Dry	Unknown	No injury
36	03/10/13	Sunday	10:49 AM	Angle collision with motor vehicle in traffic	No	Daylight	Clear	Dry	Unknown	No injury
37	03/11/13	Monday	9:39 AM	Angle collision with motor vehicle in traffic	No	Daylight	Cloudy	Dry	Operating defective equipment	No injury
38	03/12/13	Tuesday	9:07 AM	Rear-end collision with motor vehicle in traffic	No	Daylight	Clear	Dry	No improper driving	Possible non-fatal injury
39	03/13/13	Wednesday	10:58 AM	Single vehicle collision with pedestrian	Pedestrian	Daylight	Cloudy	Dry	Unknown	Possible non-fatal injury
40	03/14/13	Thursday	4:16 AM	Angle collision with motor vehicle in traffic	No	Dark - lighted roadway	Rain	Wet	Unknown	Possible non-fatal injury

Crash Diagram Ref #	Crash Date	Crash Day	Crash Time of Day	Manner of Collision	Nonmotorist	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Injury Severity
41	03/15/13	Friday	6:52 PM	Single vehicle collision with pedestrian	No	Dusk	Cloudy	Dry	Other improper action	Incapacitating non-fatal injury
42	03/16/13	Saturday	12:37 AM	Angle collision with motor vehicle in traffic	No	Dark - lighted roadway	Clear	Dry	Illness	Non-fatal injury
43	03/17/13	Sunday	7:05 AM	Sideswipe collision with pedestrian, same direction	Pedestrian	Dawn	Rain	Wet	No improper driving	Possible non-fatal injury

Appendix C

Estimation of Yellow Change, Red Clearance, and Pedestrian Intervals

APPENDIX C

Estimation of Yellow Change, Red Clearance, and Pedestrian Intervals

Estimate for Through and Right-Turn Movements

Approach	Speed Limit (mph)	V (mph)	W (ft)	L (ft)	Yellow Interval(s)	Red Clearance(s)	Total Duration(s)
Washington Street EB	25	32	62	20	3.5	1.0	4.5
Liberty Street NB	25	32	60	20	3.5	1.0	4.5
Washington Street WB	25	32	60	20	3.5	1.0	4.5

Estimate for Left -Turn Movements

Approach	Speed Limit (mph)	V (mph)	W (ft)	L (ft)	Yellow Interval(s)	Red Clearance(s)	Total Duration(s)
Washington Street EB	25	20	69	20	2.5	2.5	5.0
Liberty Street NB	25	20	63	20	2.5	2.0	4.5

Estimate for All Movements

Approach	Speed Limit (mph)	V (mph)	W (ft)	L (ft)	Yellow Interval(s)	Red Clearance(s)	Total Duration(s)
Washington Street EB	25	32	62	20	3.5	2.5	6.0
Liberty Street NB	25	32	60	20	3.5	2.5	6.0
Washington Street WB	25	32	60	20	3.5	2.5	6.0

Estimate for Pedestrian Movements

Approach	Distance (ft)	Walk Interval(s)	Pedestrian Clearance Time(s)	Total Pedestrian Phase Time(s)	Suggested Red Clearance(s)
Washington Street (West Leg)	30	7.0	9.0	16.0	1.0 to 3.0
Liberty Street (South Leg)	32	7.0	9.5	16.5	1.0 to 3.0
Washington Street (West Leg)	35	7.0	10.0	17.0	1.0 to 3.0
Liberty Street (North Leg)	34	7.0	10.0	17.0	1.0 to 3.0

Notes:

Approach: EB= Eastbound. NB = Northbound. WB= Westbound.

L = Length of vehicle; set at 20 feet.

V = 85th percentile approach speed; miles per hour (mph).

W = Intersection width measured from the approaching movement stop line to the far side of the intersection (feet).

Based on the Institute of Transportation Engineers' Guidelines for Determining Traffic Signal Change and Clearance Intervals. This study applied the following assumptions: The through movement 85th percentile approach speeds and intersection clearance speeds were estimated by adding 7 mph to the posted speeds, the left-turn 85th percentile approach speeds were estimated by deducting 5 mph from the posted speeds, and the left-turn intersection clearance speeds were assumed to be 20 mph. The motorist perception-reaction time was assumed to be 1.0 second for through and right-turn movements and 0.6 second for left-turn movements. The conflicting movement start-up delay was assumed to be one second. The deceleration rate was assumed 10 feet/second/second. The approach grade was assumed to be zero for all approaches.