

2020 Northern Middlesex Regional Transportation Safety Report

Prepared for the Northern Middlesex Metropolitan Planning
Organization by the Northern Middlesex Council of Governments



September 2020

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TABLE OF CONTENTS

INTRODUCTION	6
The Cost Of Crashes	6
A PERFORMANCE MANAGEMENT APPROACH	7
Safety Performance Measures and Targets	7
Fatalities	8
Incapacitating Injuries	10
Total Number of Non-Motorized Incapacitating Injuries and Fatalities	11
Addressing Performance Measures and Targets	13
Identifying Regional High Crash Locations	13
Top 100 High Crash Intersections in the Northern Middlesex Region	15
MassDOT Top 200 crash report	27
Bike and Pedestrian Safety	28
ADDRESSING SAFETY	30
Addressing Safety Through The TIP	30
Highway Safety Improvement Program and Strategic Safety Plan	30
MassDOT's High Crash Cluster Method for Determining HSIP Funding Eligibility	32
Motor Vehicle Related Crash Clusters	32
Pedestrian Related Crash Clusters	34
Bicycle Related Crash Clusters	35
Roadway Safety Audits Role in HSIP Funding Determination	36
Transit Safety and Security For The LRTA System	38
LRTA Public Transportation Agency Safety Plan	39
Security of The Transportation System	39
STATE SAFETY INITIATIVES	41
MassDOT Crash Portal	41
Complete Streets	41
Complete Streets Funding Program	43
Safe Routes to School	45
CONCLUSION: ROADWAY SAFETY ISSUES AND OPPORTUNITIES	46

ACRONYM GUIDE

DHS (Department of Homeland Security)

EMS (Emergency Medical Services)

EOPSS (Executive Office of Public Safety and Security)

EPDO (Equivalent Property Damage Only)

FAST Act (Fixing America's Surface Transportation Act)

FEMA (Federal Emergency Management Agency)

FHWA (Federal Highway Administration)

FTA (Federal Transit Administration)

HSIP (Highway Safety Improvement Program)

ITS (Intelligent Transportation System)

LEPCs (Local Emergency Planning Committees)

LRTA (Lowell Regional Transit Authority)

MEMA (Massachusetts Emergency Management Agency)

MPO (Metropolitan Planning Organization)

NMCOG (Northern Middlesex Council of Governments)

NMMPO (Northern Middlesex Metropolitan Planning Organization)

PTASP (Public Transportation Agency Safety Plan)

RMV (Registry of Motor Vehicles)

RSA (Roadway Safety Audit)

RTP (Regional Transportation Plan)

SHSP (Strategic Highway Safety Plan)

TIP (Transportation Improvement Program)

UPWA (Unified Planning Work Program)

USDOT (US Department of Transportation)

VMT (Vehicle Miles Travelled)

INTRODUCTION

Local, state, and federal transportation, law enforcement, and emergency response agencies work cooperatively to construct, maintain, and monitor transportation networks, and assist travelers in need, but each transportation user must be vigilant when traveling to help ensure their own safety and security. Similar to other issues that are linked to the construction and operation of transportation facilities (e.g., air quality and economic development), travel safety is clearly an issue that can be affected by how the transportation system is designed, constructed, operated, and maintained. Given that transportation-planning leads to changes in the transportation system, safety and security should be thoroughly integrated into the planning process. The FFY 2020 Northern Middlesex Regional Safety Report examines transportation safety conditions across the region. Ensuring the safe travel of the public is the most important goal of this program.

Before one can identify the types of strategies or investments that can improve safety, safety issues and challenges must first be understood. This means not only understanding the “big picture” from the perspective of numbers and incidence of road-related fatalities and major injuries, but also analyzing the leading contributing factors. The best examples of safety conscious planning have begun with a comprehensive analysis of data. Over the past two decades, NMMPO staff has worked with MassDOT, FHWA, FTA and the LRTA to identify safety issues that need to be addressed, and has strived to prioritize projects with safety benefits.

Assessments of regional safety conditions often lead to future detailed studies of top crash locations through the region’s Unified Planning Work Program (UPWP), MassDOT’s Roadway Safety Audit (RSA) Program, and the Highway Safety Improvement Program (HSIP). NMMPO staff provides technical assistance to its local communities in determining the causes of identified safety problems. In addition, NMMPO assigns priority to projects that address safety when developing the region’s Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP).

The Cost Of Crashes

The National Safety Council estimates the cost of motor vehicle crashes based on severity, in order to illustrate the impact on the nation’s economy. These costs are based on dollars spent and lost income due to property damage, injury, or death. The goal is to quantify the importance of preventing motor vehicle crashes. The calculable costs of motor vehicle crashes include wage and productivity losses, medical expenses, administrative expenses, vehicle damage, and employers’ uninsured costs. Table 1 illustrates the estimated average cost for a motor vehicle related death, injury or property damage only crash.

Table 1: Economic Costs Associated With Severity of Vehicular Crash (FHWA)

Crash Severity	Cost
Fatal Injury	\$ 4,008,900
Non-Fatal Injury	\$ 82,600
Property Damage Only	\$ 7,400

Source: FHWA “Highway Safety Benefit Cost Analysis Guide”

A PERFORMANCE MANAGEMENT APPROACH

Transportation performance management is a data driven strategic process that uses system information to make investment and policy decisions in order to achieve performance goals. The Federal Highway Administration (FHWA) established National Performance Management Rules addressing safety, effective as of April 14, 2016. Under these rules, MassDOT and the NMMPO are charged with establishing performance targets that address the national performance measures, including the following:

- Number of Fatalities
- Rate of Fatalities per 100 million Vehicle Miles Travelled (VMT)
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million VMT
- Number of non-motorized Fatalities and Serious Injuries.

MassDOT has established statewide performance targets for each national measure outlined in the rulemaking. The NMMPO has collaborated with MassDOT and regional partners to establish and/or refine regional targets, either adopting the state targets or developing regional targets.

The FFY 2020-2040 Regional Transportation Plan (RTP) outlines regional targets and performance measures associated with the safety program. The overall goal of the Northern Middlesex safety management program is to “Improve the safety of the transportation system for all users”. The objectives described are: (1) to advance safe travel; (2) to reduce the number and severity of crashes for all modes of transportation; and (3) to promote the use of Intelligent Transportation System (ITS)

Safety Performance Measures and Targets

The NMMPO’s safety performance measures are consistent with the emphasis area goals outlined in the Massachusetts Strategic Highway Safety Plan (SHSP). The NMMPO has adopted statewide performance measures and targets for 2019. Included in Table 2 is a long-term target for the region out to 2040. MassDOT does not provide specific targets to 2040 beyond the long-term goal of zero roadway deaths. The 2020 Northern Middlesex Regional Transportation Plan set goal of a 20% reduction in fatalities and injuries by 2040. The fatality and incapacitating rates for the region are consistently below state averages.

Fatalities

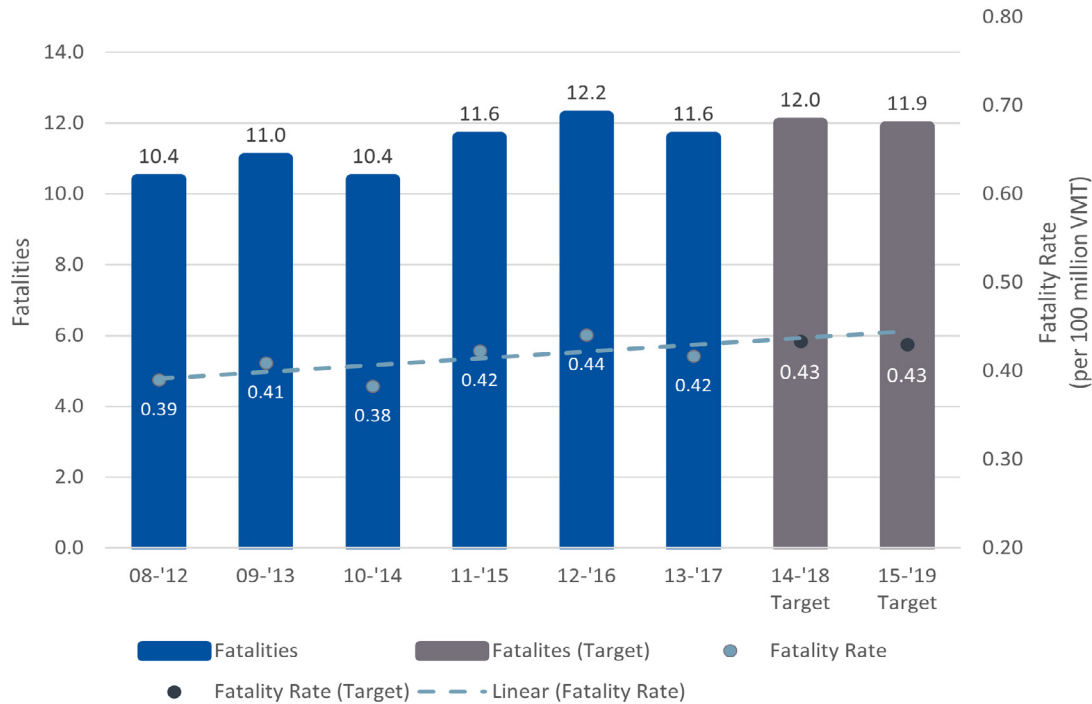
In the Northern Middlesex region, there was an average of 11.6 fatalities as a result of motor vehicle crashes from 2013-2017. Achieving the regional target of 20% reduction by 2040 would result in 9.76 fatalities. The long-term goal of zero deaths on roadways in the Commonwealth is the standard, which this Plan strives to achieve. The NMMPO has adopted statewide targets, as shown in Table 2.

Table 2: Safety Performance Measures and Targets

Performance Measure	Current State Performance (Rolling Five Year Average 2013-2017)	CY 2020 State Performance Target (Rolling Five Year Average 2016-2020)*	Regional Rolling Five Year Average 2013-2017	2040 Regional Targets (20% Reduction)
Fatalities	357	347	58	49
Rate of Fatalities per 100 mil VMT	0.59	0.56	0.41	0.35
Incapacitating Injuries	2943	2689	626	506
Incapacitating Injuries per 100 mil	4.84	4.3	4.5	3.66
Non-Motorized Incapacitating Injuries and Fatalities	518	505	105	72

Source: MassDOT

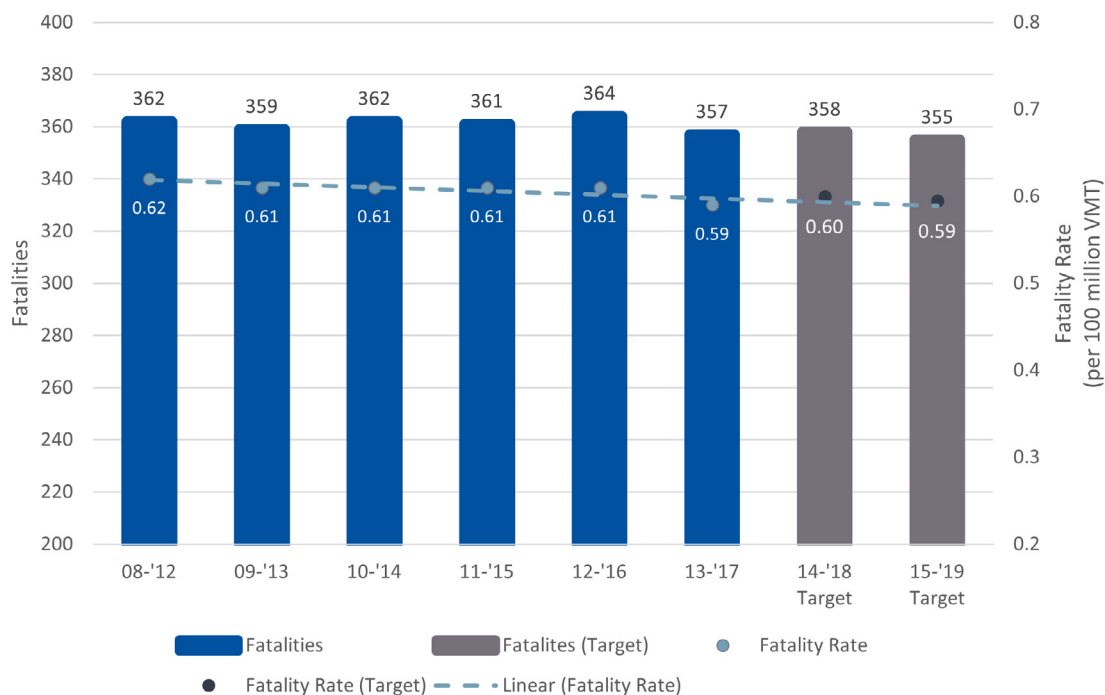
Figure 1: Regional 5-Year Fatality Averages and Rates



Source: NMCOG Crash Data

Figure 1 above shows total fatalities and fatality rates, as well as projected targets for calendar years 2018 and 2019, for the region based on the RTP long-term target of achieving a 20% reduction in fatalities by 2040. Figure 2 below shows the state 5-year fatality averages and rates which are higher than those of the region.

Figure 2: State Wide 5-Year Fatality Averages and Rates

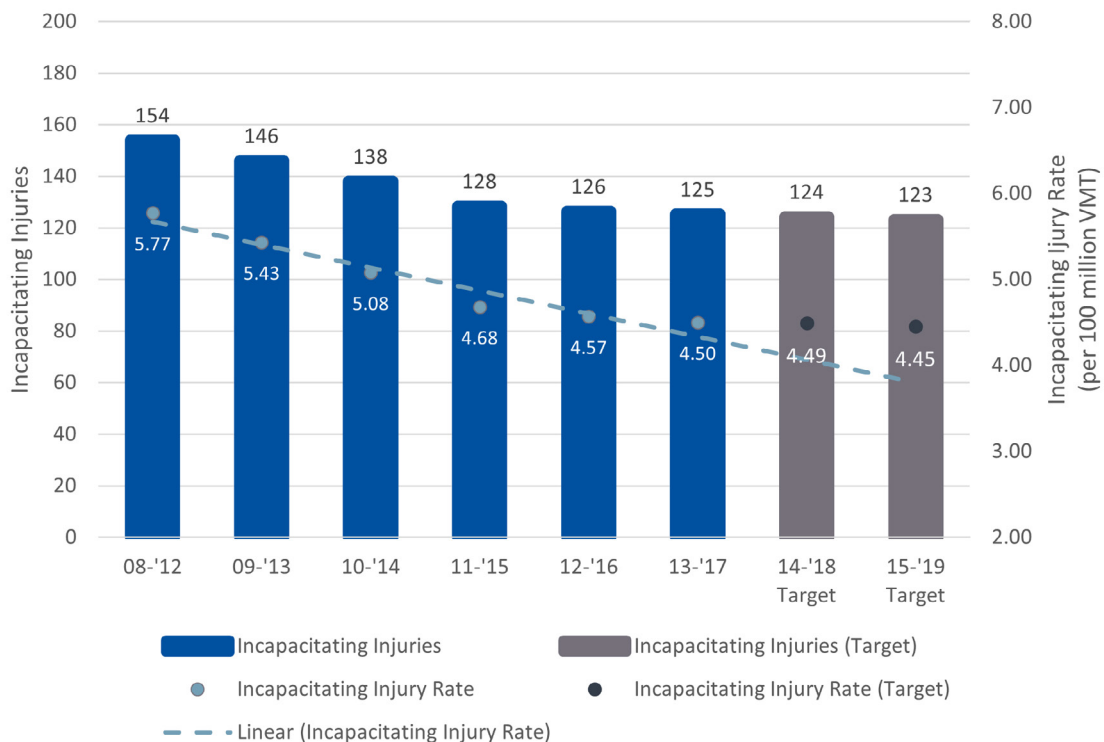


Source: MassDOT Crash Data

Incapacitating Injuries

In the Northern Middlesex region, there was an average of three hundred and fifty-seven (357) incapacitating injuries as a result of motor vehicle crashes during the most recent five-year period for which data is available (2013-2017). There was a total of 2,943 reported incapacitating injuries in the Commonwealth during the same period. Achieving the regional target of a 20% reduction by 2040 would result in 101 incapacitating injuries. The MPO has adopted statewide targets for incapacitating injuries, as shown in Figure 3.

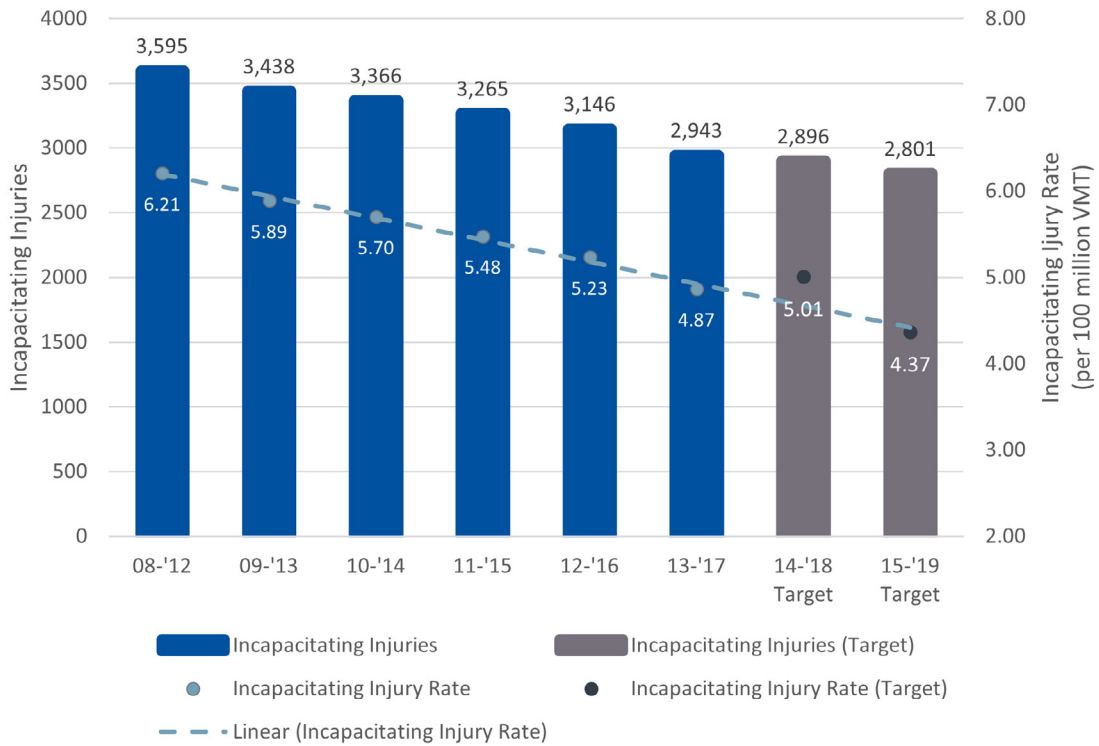
Figure 3: Regional 5-Year Incapacitating Injury Averages and Rates



Source: NMCOG Crash Data

Figure 4 shows total incapacitating injuries and injury rates, as well as projected targets for calendar years 2018 and 2019, for the region based on the RTP long-term target of achieving a 20% reduction in these types of incidents by 2040. Injuries and injury rates have steadily declined in the region and the NMMPO will strive to continue this trend.

Figure 4: State Wide 5-Year Incapacitating Injury Averages and Rates



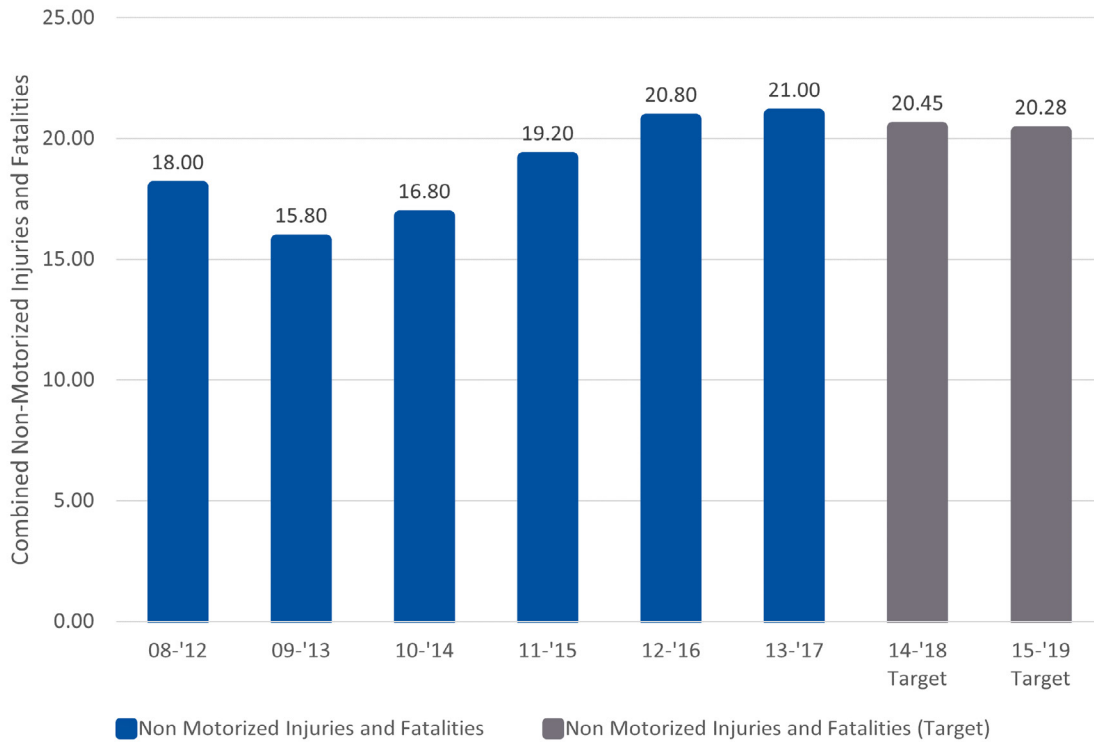
Source: MassDOT Crash Database

Total Number of Non-Motorized Incapacitating Injuries and Fatalities

In the Northern Middlesex region, there was an average of twenty-one (21) combined non-motorized Incapacitating injuries and fatalities as a result of motor vehicle crashes during the most recent five-year period for which data is available (2013-2017). There was a total of 519 such crashes reported in the Commonwealth during the same time period. Achieving the regional target of a 20% reduction by 2040 would result in a goal of 16 non-motorized incapacitating injuries and fatalities. The MPO has adopted the statewide targets, as shown in Figure 5.

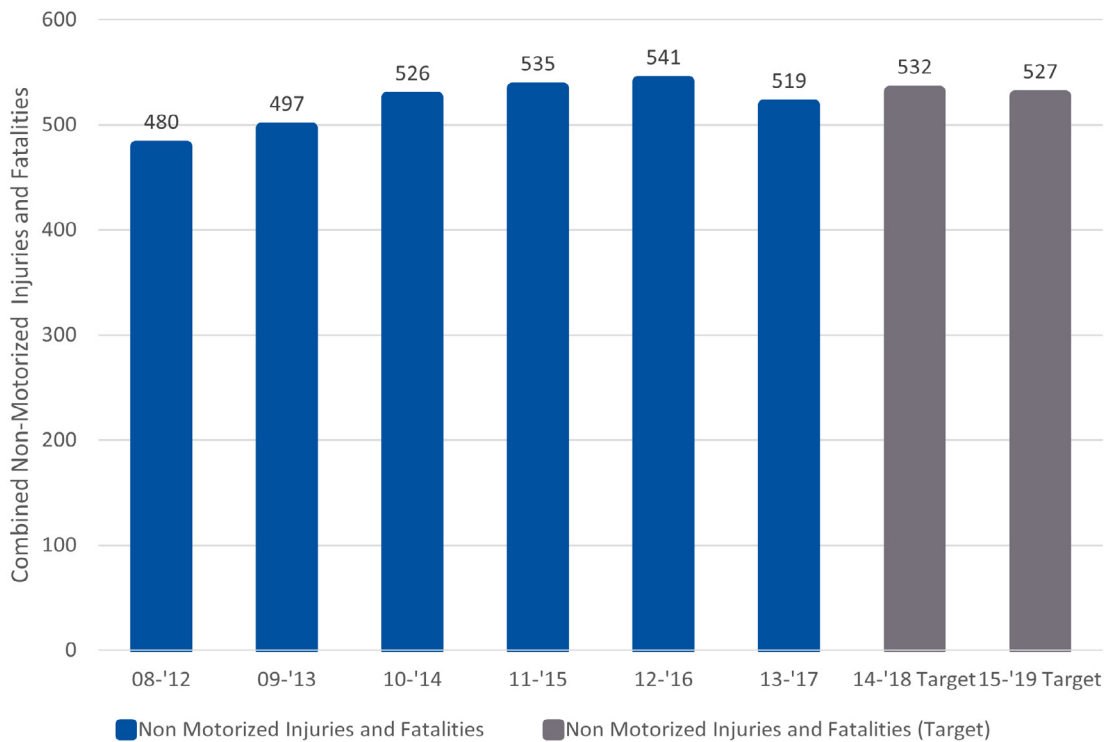
Figure 6 shows total non-motorized incapacitating injuries and fatalities, as well as projected targets for calendar years 2018 and 2019, for the region, based on the RTP long-term target of achieving a 20% reduction in these types of incidents by 2040.

Figure 5: Regional 5-Year Combined Non-Motorized Injury and Fatality Averages



Source: NMCOG Crash Data

Figure 6: State Wide 5-Year Combined Non-Motorized Injury and Fatality Averages



Source: MassDOT Crash Database

Addressing Performance Measures and Targets

The NMMPO's safety program incorporates the following actions to achieve the goals set out in the program:

- High crash location identification
- Determination of project eligibility for HSIP funding
- Programming of safety-related projects into the regional RTP and TIP documents.

Identifying Regional High Crash Locations

As part of its overall traffic safety program, the NMMPO has developed four principal goals:

- Identify locations with transportation safety problems
- Notify local and state officials, and the public of safety problems and concerns
- Provide technical assistance to local communities in determining the cause of the crashes at problem locations
- Identify strategies for addressing and mitigating identified safety deficiencies

In Massachusetts, crash data is collected by MassDOT and the Massachusetts Registry of Motor Vehicles (RMV). The NMMPO uses this data to determine the Top 100 most hazardous intersections within the region over a three-year period. The data is also used to assess the need for safety improvements at locations deemed to be problematic. The most recent data available through the Commonwealth covers calendar years 2015 through 2017. In accordance with FHWA safety performance measures, the following narrative compares crash rates from 2015-2017 with past periods.

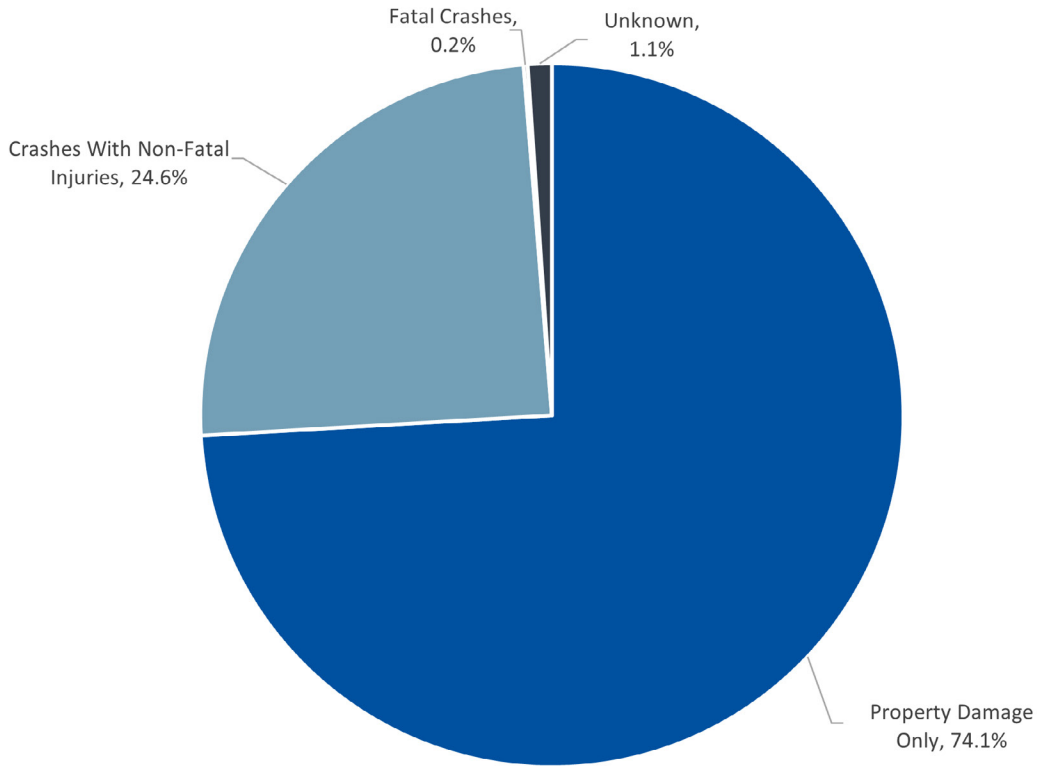
From 2015 through 2017, there were 19,461 reported crashes within the nine communities comprising the region. Table 3 summarizes the total number crashes by year and severity. Non-fatal injuries accounted for 25% (4,793) of crashes, while less than 1% (36) of crashes resulted in fatalities.

Table 3: Regional Number of Crashes by Severity

Severity of Crash	2015	2016	2017	2015-2017
Property Damage Only	4,787	4,842	4,788	14,417
Crashes With Non-Fatal Injuries	1,507	1,675	1,611	4,793
Fatal Crashes	12	14	10	36
Unknown	60	59	96	215
Total Crashes	6,366	6,590	6,505	19,461

Source: NMCOG Crash Data

Figure 7: Regional Motor Vehicle Crashes by Severity



Source: NMCOCG Crash Data

When comparing the number of crashes from 2012-2014 with those reported in 2015-2017, there was a 1% increase. Injury crashes increased by 9% during the same timeframe, while the number of fatalities increased by 13%, as shown in Table 4.

Table 4: Regional Comparison of Crash Data 2012-2014 and 2015-2017

Year	2012-2014	2015-2017	Total Change	% Change
Property Damage Only	12,583	14,417	1,834	15%
Crashes With Non-Fatal Injuries	4,391	4,793	402	9%
Fatal Crashes	32	36	4	13%
Unknown	2,314	215	-2,099	-91%
Total Crashes	19,320	19,461	141	1%

Source: NMCOCG Crash Data

Top 100 High Crash Intersections in the Northern Middlesex Region

The Top 100 high crash intersections were determined using three years of crash data, to account for annual variations caused by construction, road closures, or discrepancies in crash reporting practices of local police departments and the RMV. The RMV receives the crash reports from local and state police departments, and the data is used to create a database for the entire state. MassDOT uses the database to map the crashes using Geographic Information Systems (GIS). The data is then provided to the NMMPO staff.

The NMMPO staff flags intersections that experience fifteen (15) or more crashes in a three-year period as candidate locations for the Top 100 list. A detailed review of each record associated with each candidate intersection is performed. The high crash intersection ranking system is based on the Equivalent Property Damage Only (EPDO) methodology. Each crash is assigned a numeric value based on reported severity. Property damage only crashes are assigned one (1) point, injury crashes are assigned five (5) points, and fatal crashes are assigned ten (10) points. The points assigned to each crash at a given location are added to determine the intersection's EPDO value.

Table 5 provides a summary of the total crashes within each community from 2015-2017 and identifies the number of intersections that are ranked in the Top 100. The City of Lowell had the greatest number of crashes (10,393) between 2015 and 2017 and had the largest number of intersections (73) on the Top 100 High Crash List. The City is by far the most urbanized and densely populated community in the region and has the greatest number of roadways per square mile when compared to other municipalities. This dense, urban setting creates more opportunities for vehicle conflicts and crashes than one would typically find in a suburban or rural community. Due to its rural nature and limited roadway miles, the Town of Dunstable recorded the fewest number of crashes of the communities within the region.

Table 5: Regional Crash Breakdown by Community 2015-2017

Community	2015	2016	2017	Grand Crashes 2015-2017	Intersections On Regional Top 100 High
Billerica	674	709	661	2,044	9
Chelmsford	742	727	686	2,155	5
Dracut	420	353	364	1,137	4
Dunstable	35	57	72	164	0
Lowell	3,427	3,423	3,543	10,393	73
Pepperell	165	219	192	576	0
Tewksbury	646	760	705	2,111	6
Tyngsborough	325	343	346	1,014	3
Westford	491	574	448	1,513	3

Source: NMMCOG Crash Data

Table 6 identifies the top high crash intersection location within each community for the 2015-2017 reporting period. The intersection of VFW Highway at Bridge Street in Lowell, with 232 crashes and an EPDO of 277, ranked as the top high crash intersection. The NMMPO will continue to monitor this location, as safety upgrades are now complete. Locations in Dunstable and Pepperell are not listed in the Top 100 region or identified as a MassDOT HSIP cluster. Thus, there are no locations in either Town eligible for HSIP funding.

Table 6: Highest Crash Intersection in Each NMMCOG Community, 2015-2017

Community	Intersection	Intersection Control	Total Crashes Reported	EPDO	Regional Rank
Billerica	Rte 129 (Salem Rd) at Pond St	Traffic Signal	40	104	18
Chelmsford	Rte 110 (Chelmsford St) at Stedman St	Traffic Signal	25	81	34
Dracut	Rte 113 (Pleasant St) at Lakeview Ave	Traffic Signal	34	62	53
Dunstable	Rte 113 (Main St) at Forest St	Stop	3	15	222
Lowell	VFW Highway at Bridge St	Traffic Signal	149	277	1
Pepperell	Route 113 (Main Street) at Mill/Canal Streets	Stop	19	29	153
Tewksbury	Salem St at South St	Stop	54	114	12
Tyngsborough	Rte 113 (Kendall Rd) at Rte 3A (Middlesex Rd)	Traffic Signal	78	182	5
Westford	Rte 110 (Littleton Rd) at Boston Rd	Traffic Signal	77	117	11

Source: NMMCOG Crash Data

Table 7 contains the Top 100 high crash intersection list for the region based on 2015-2017 data. Seventy-three percent (73%) of the intersections on the Top 100 list are located in the City of Lowell, including nine (9) of the top ten (10) crash locations. Map 1 shows the location of each intersection listed in the Top 100, while Map 2 provides a more detail view of locations within the City of Lowell.

It should be noted that this data does not reflect the impact of improvements made since 2017. For example, safety upgrades made to the VFW Highway/Bridge Street intersection in Lowell were not complete until 2017, thus the data in this table reflects the previous roadway configuration.

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
1	VFW Highway at Bridge St	Lowell	Traffic Signal	149	117	32	0	277
2	Wood St at Middlesex St	Lowell	Traffic Signal	113	87	26	0	217
3	VFW Highway/Varnum Ave at School St/Mammoth Rd	Lowell	Traffic Signal	113	92	21	0	197
4	Appleton St/Church St at Central St	Lowell	Traffic Signal	84	58	26	0	188
5	Rte 113 (Kendall Rd) at Rte 3A (Middlesex Rd)	Tyngsborough	Traffic Signal	78	52	26	0	182
6	VFW Highway at Aiken St	Lowell	Traffic Signal	65	44	21	0	149
7	Plain St at Manufacturers St	Lowell	Stop	70	52	18	0	142
8	School St at Branch St	Lowell	Traffic Signal	55	36	19	0	131
9	Gorham St at Appleton St	Lowell	Traffic Signal	48	29	19	0	124
10	Gorham St at Elm St/Highland St	Lowell	Traffic Signal	62	48	14	0	118
11	Rte 110 (Littleton Rd) at Boston Rd	Westford	Traffic Signal	77	67	10	0	117
12	Rte 110 (Chelmsford St) at Plain St/Powell St	Lowell	Traffic Signal	66	54	12	0	114
12	Salem St at South St	Tewksbury	Stop	54	39	15	0	114
14	Rte 38 (Main St) at Shawsheen St	Tewksbury	Traffic Signal	61	48	13	0	113
15	Wood St at Rte 113 (Pawtucket Blvd)	Lowell	Traffic Signal	56	42	14	0	112
16	Dutton St at Fletcher St	Lowell	Traffic Signal	57	44	13	0	109
16	Broadway at Fletcher St	Lowell	Traffic Signal	45	29	16	0	109
18	Rte 38 (Nesmith St) at Rte 133 (Andover St)	Lowell	Traffic Signal	60	49	11	0	104
18	Rte 129 (Salem Rd) at Pond St	BillERICA	Traffic Signal	40	24	16	0	104

Source: NMCOC Crash Data

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
20	Rte 3A (Westford St) at Wilder St	Lowell	All Way Stop	55	44	11	0	99
21	School St at Pawtucket St	Lowell	Traffic Signal	54	43	11	0	98
21	Rte 3A (Thorndike St) at Highland St	Lowell	Traffic Signal	62	53	9	0	98
21	VFW Highway at University Ave	Lowell	Traffic Signal	54	43	11	0	98
24	Rte 3A (Princeton St) at Wood St	Lowell	Traffic Signal	41	27	14	0	97
25	Andover Rd/Shawsheen St at Whipple Rd	Billerica/Tewksbury	Stop	39	25	14	0	95
26	Rte 38 (Main St) at Astle St/Pike St/Veranda Ave	Tewksbury	Traffic Signal	43	31	12	0	91
26	Rte 110 (Chelmsford St) at Rte 3A (Westford St)	Lowell	Traffic Signal	39	26	13	0	91
28	Rte 3A (Thorndike St) at YMCA Dr/Hale St	Lowell	Traffic Signal	51	42	9	0	87
29	Wood St at Westford St	Lowell	Traffic Signal	45	35	10	0	85
30	Route 113 (Riverside St) at Sparks St	Lowell	Stop	39	28	11	0	83
31	Church St at Lawrence St	Lowell	Traffic Signal	46	37	9	0	82
31	Bridge St/Prescott St at Merrimack St (Kearney Square)	Lowell	Traffic Signal	42	32	10	0	82
31	Central St at Warren St	Lowell	Stop	50	42	8	0	82
34	Middlesex St at School St	Lowell	Traffic Signal	29	16	13	0	81

Source: NMCOC Crash Data

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
34	Rte 110 (Chelmsford St) at Stedman St	Chelmsford	Traffic Signal	25	11	14	0	81
36	Drum Hill Rd at Parkhurst Rd	Chelmsford	Traffic Signal	40	30	10	0	80
37	Mammoth Rd at Fourth Ave	Lowell	Stop	46	38	8	0	78
38	VFW Highway at Riverside St	Lowell	Stop	45	37	8	0	77
39	Central St at Middlesex St/Green St	Lowell	Traffic Signal	44	36	8	0	76
40	Rte 38 (Nesmith St) at East Merrimack St	Lowell	Traffic Signal	39	30	9	0	75
41	Rte 110 (Chelmsford St) at Stevens St/Industrial Ave	Lowell	Traffic Signal	34	24	10	0	74
41	Rte 110 (Chelmsford St) at Lincoln St	Lowell	Traffic Signal	34	24	10	0	74
43	Lakeview Ave at Aiken St	Lowell	Traffic Signal	38	30	8	0	70
44	Rte 3A (Princeton St) at Baldwin St	Lowell	Traffic Signal	25	14	11	0	69
45	Merrimack St at Central St	Lowell	Traffic Signal	32	23	9	0	68
46	Rte 3A (Westford St) at Stevens St	Lowell	Traffic Signal	27	17	10	0	67
47	Appleton St at South St	Lowell	Stop	26	16	10	0	66
48	Rte 3A (Boston Rd) at Cook St	Billerica	Traffic Signal	21	10	11	0	65
49	Rte 110 (Littleton Rd) at Tadmuck Rd	Westford	Traffic Signal	32	24	8	0	64
50	Rte 3A (Gorham St) at Moore/Dix St	Lowell	Traffic Signal	35	28	7	0	63
50	Westford St at Stedman St	Lowell	Stop	35	28	7	0	63
50	Rte 3A (Boston Rd) at Treble Cove Rd	Billerica	Traffic Signal	31	23	8	0	63

Source: NMCOG Crash Data

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
53	Rte 113 (Pleasant St) at Lakeview Ave	Dracut	Traffic Signal	34	27	7	0	62
53	Central St at Market St	Lowell	Traffic Signal	34	27	7	0	62
55	Fletcher St at Bowers St	Lowell	Stop	33	26	7	0	61
55	Church St at Warren St	Lowell	Stop	29	21	8	0	61
57	Rte 3A (Westford St) at School St	Lowell	Traffic Signal	28	20	8	0	60
58	Rte 38 (Bridge St) at Rte 113 (Arlington St)	Dracut	Traffic Signal	26	19	6	1	59
58	Middlesex St at Wilder St	Lowell	All Way Stop	35	29	6	0	59
58	Father Morrisette Boulevard at Aiken St	Lowell	Traffic Signal	31	24	7	0	59
58	Rte 3A (Boston Rd) at Cummings Rd	BillERICA	Traffic Signal	35	29	6	0	59
58	Rte 110 (Chelmsford St) at Parker St	Lowell	Stop	31	24	7	0	59
63	East Merrimack St at High St	Lowell	Stop	42	38	4	0	58
63	Rte 3A (Princeton St/ Tyngsborough Rd) at Rte 40 (Groton Rd)	Chelmsford	Traffic Signal	18	8	10	0	58
63	Rte 3A (Frost Rd) at Charles Chronopoulos Way	Tyngsborough	Traffic Signal	26	18	8	0	58
66	Fletcher St at Cross St	Lowell	Stop	29	22	7	0	57
66	Lawrence St at Rogers St	Lowell	Traffic Signal	21	12	9	0	57
68	Rte 38 (Bridge St) at Second St	Lowell	Stop	44	41	3	0	56
69	Rte 113 (Riverside St) at University Ave	Lowell	Traffic Signal	35	30	5	0	55

Source: NMCOG Crash Data

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
70	Middlesex St at Baldwin St	Lowell	Stop	26	19	7	0	54
70	Route 38 (Main St) at Pleasant St	Tewksbury	Traffic Signal	22	14	8	0	54
70	Aiken St at Perkins St	Lowell	Stop	26	19	7	0	54
73	Andover St at High St	Lowell	Traffic Signal	29	23	6	0	53
73	Pawtucket St at Wannalancit St	Lowell	Stop	21	13	8	0	53
75	Route 38 (Main St) at Capitol Ave	Tewksbury	Traffic Signal	24	17	7	0	52
75	Mammoth Rd at Second Ave	Lowell	Stop	36	32	4	0	52
77	Rte 38 (Rogers St) at Boylston St	Lowell	Traffic Signal	31	26	5	0	51
77	Rte 38 (Nesmith St) at Stackpole St	Lowell	Traffic Signal	27	21	6	0	51
77	East St at North St	Tewksbury	Stop	23	16	7	0	51
80	Lakeview Ave at Mammoth Rd	Dracut	Traffic Signal	22	15	7	0	50
81	Rte 113 (Pawtucket Blvd) at Varnum Ave	Lowell	Traffic Signal	25	19	6	0	49
81	Rte 38 (Rogers St) at Douglas Rd/Pheonix Ave	Lowell	Traffic Signal	21	14	7	0	49
81	Rte 3A (Thorndike St) at Gallagher Terminal	Lowell	Traffic Signal	37	34	3	0	49
81	Middlesex Turnpike at Lake St	Billerica	Stop	25	19	6	0	49
81	Boston Rd at Main St	Westford	Stop	21	14	7	0	49

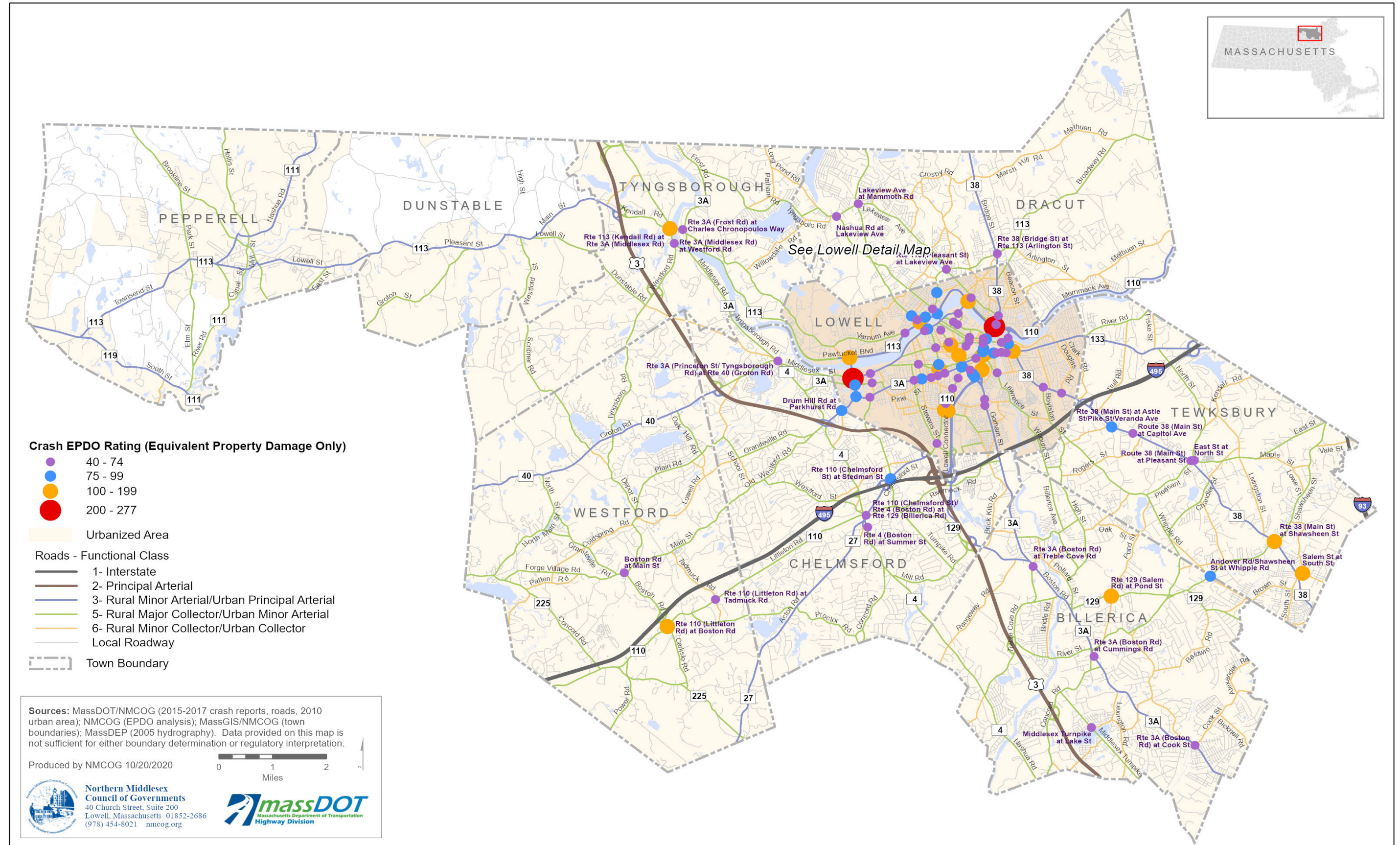
Source: NMCOC Crash Data

Table 7: Regional Top 100 High Crash Intersections

Regional Rank	Intersection	Community	Intersection Control	Total Crashes	Property Damage Only	Non-Fatal Injuries	Fatal Injuries	EPDO 2015-2017
86	Rte 38 (Bridge St) at W. Sixth St	Lowell	Traffic Signal	32	28	4	0	48
86	Rte 110 (Chelmsford St)/Rte 4 (Boston Rd) at Rte 129 (Billerica Rd)	Chelmsford	Traffic Signal	20	13	7	0	48
88	Andover St at Concord St	Lowell	Stop	31	27	4	0	47
89	Nashua Rd at Lakeview Ave	Dracut	Stop	22	16	6	0	46
89	Rte 4 (Boston Rd) at Summer St	Chelmsford	Stop	18	11	7	0	46
89	Merrimack St at Worthen St	Lowell	Stop	30	26	4	0	46
92	Broadway at School St	Lowell	Traffic Signal	25	20	5	0	45
92	Dutton St at Broadway St	Lowell	Traffic Signal	25	20	5	0	45
92	Father Morrisette Boulevard at Cabot St	Lowell	Traffic Signal	21	15	6	0	45
92	Route 3A (Westford St) at Pine St/Hastings St	Lowell	Stop	21	15	6	0	45
92	Rte 3A (Westford St) at Smith St	Lowell	Stop	21	15	6	0	45
92	Rte 3A (Gorham St) at London St	Lowell	Stop	25	20	5	0	45
98	Dutton St at Market St	Lowell	Traffic Signal	27	23	4	0	43
98	Rte 110 (Chelmsford St) at Sheldon St	Lowell	Stop	23	18	5	0	43
98	Rte 3A (Middlesex Rd) at Westford Rd	Tyngsborough	Traffic Signal	23	18	5	0	43

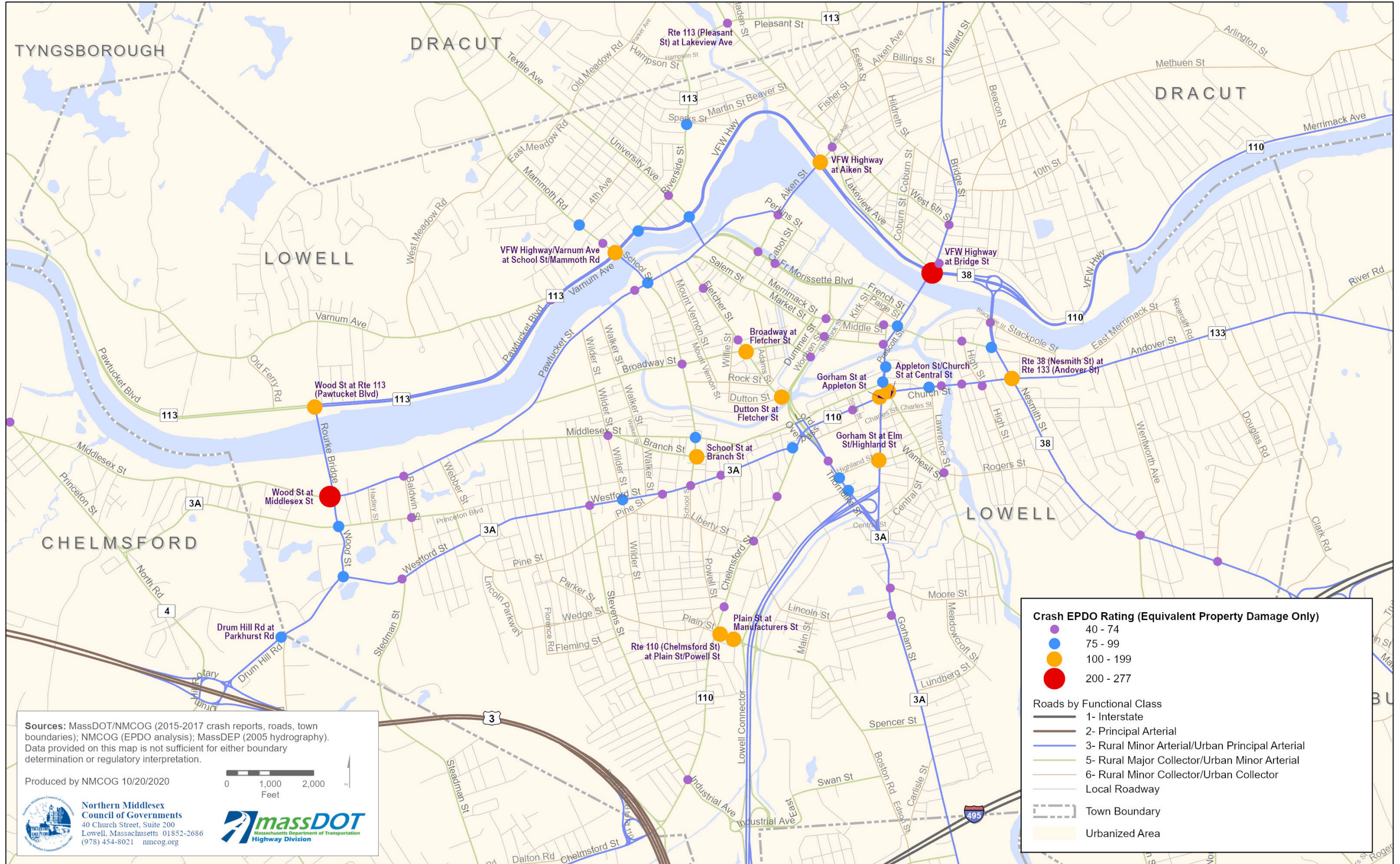
Source: NMCOC Crash Data

Map 1: Top 100 Crash Locations in the Northern Middlesex Region



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Map 2: Top 100 Crash Locations in the Northern Middlesex Region (Lowell Detail) 2015-2017



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MassDOT Top 200 crash report

MassDOT maintains a “Top 200” list of high crash locations around the Commonwealth. There are nineteen locations shown in the rankings that lie within the Northern Middlesex region, as presented in Table 8. Each of these locations aside from two are also listed in the regional Top 100, and are eligible for HSIP funding. Lord Overpass at Appleton, while in MassDOT “Top 200” is not in our regional rankings due to its classification as a rotary, making it difficult to distinguish exactly where crashes are happening.

Table 8: NMCOG Region Intersections in MassDOT “Top 200”

Intersection	MassDOT "Top 200" Crash Intersections Rank	Community	Intersection Control	2017 Regional Rank
VFW Highway at Bridge St	1	Lowell	Traffic Signal	1
Appleton St/Church St at Central St	2	Lowell	Traffic Signal	4
Rte 113 (Kendall Rd) at Rte 3A (Middlesex Rd)	6	Tyngsborough	Traffic Signal	5
VFW Highway at Aiken St	12	Lowell	Traffic Signal	6
VFW Highway/Varnum Ave at School St/Mammoth Rd	20	Lowell	Traffic Signal	3
Rte 129 (Salem Rd) at Pond St	31	Billerica	Stop	18
Gorham St at Appleton St	69	Lowell	Traffic Signal	9
School St at Branch St	75	Lowell	Traffic Signal	8
Rte 38 (Nesmith St) at Rte 133 (Andover St)	79	Lowell	Traffic Signal	18
Andover Rd/Shawsheen St at Whipple Rd	104	Billerica/Tewksbury	Stop	25
Gorham St at Elm St/Highland St	109	Lowell	Traffic Signal	10
Salem St at South St	112	Tewksbury	Stop	12
Gorham St at Central Street	133	Lowell	Traffic Signal	N/A
Lord Overpass and Appleton St	154	Lowell	Traffic Signal	N/A
School Street and Middlesex Street	158	Lowell	Traffic Signal	34
Westford Street and Wilder Street	165	Lowell	All Way Stop	20
VFW Highway and University Ave	172	Lowell	Traffic Signal	21
Broadway St and Fletcher St	181	Lowell	Traffic Signal	16
Appleton St and South St	188	Lowell	Stop	47

Source: MassDOT/NMCOG Crash Data

Bike and Pedestrian Safety

According to FHWA, each year bicycle and pedestrian fatalities comprise about 16 percent of all traffic fatalities and there are approximately 5,000 pedestrian and 800 bicyclist deaths. Another 65,000 pedestrians and 48,000 bicyclists are injured in roadway crashes annually*. It is important that the planning, design, operation and maintenance of transportation facilities consider the needs of bicyclists and pedestrians. MassDOT Directive E-98-003, which was adopted in 1998, requires that design engineers use sound engineering practices in making reasonable provisions for the accommodation of bicycles and pedestrians in project design.

Figure 9 below shows Bike and Pedestrian crashes between 2008 and 2017. Both bike and pedestrian related crashes have been steadily increasing since 2008. However, from 2015 to 2017 there were noticeable declines in both Bike and Pedestrian related crashes.

Figure 8: Regional Bike and Pedestrian Crashes, 2008-2017

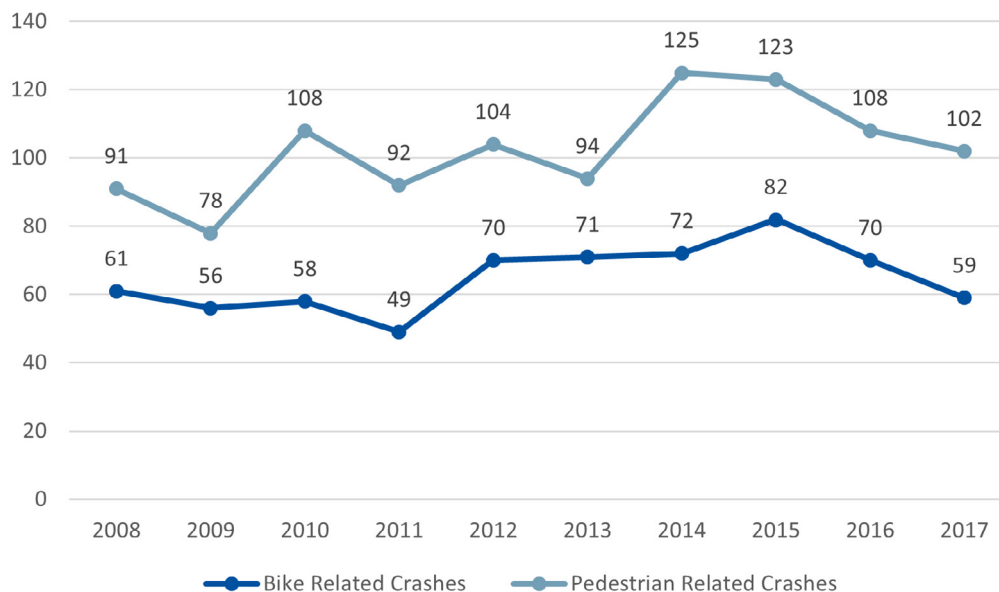


Table 9: Regional Bike and Pedestrian Related Crashes, 2013-2017

Category	2013	2014	2015	2016	2017	Total
Bike Related Crashes	71	72	82	70	59	354
Pedestrian Related Crashes	94	125	123	108	102	552
Total	165	197	205	178	161	906

Source: NMCOC Crash Data

* Federal Highway Administration https://safety.fhwa.dot.gov/ped_bike/ (Updated January 24, 2020)

Table 10: Regional Pedestrian Related Crashes by Severity and Community, 2013-2017

Community	Property Damage Only	Non-Incapacitating Injury Crashes	Incapacitating Injury Crashes	Fatal Crashes	Unknown / Not reported	Total
Billerica	8	9	6	5	0	28
Chelmsford	1	18	4	3	0	26
Dracut	2	15	1	0	0	18
Dunstable	0	0	0	0	0	0
Lowell	96	216	52	3	36	403
Pepperell	0	8	1	0	0	9
Tewksbury	10	30	7	3	0	50
Tyngsborough	1	3	1	1	0	6
Westford	8	3	1	0	0	12
Total	126	302	73	15	36	552

Source: NMCOG Crash Data

Between 2013 and 2017, there were a total of 552 crashes involving pedestrians and 552 crashes involving bicyclists within the Northern Middlesex region. Of the pedestrian crashes, 390 resulted in injury of which 73 were incapacitating and 15 fatal. There were 197 injury-related bicycle crashes with 15 reported incapacitating and one fatal between 2013 and 2017. Furthermore, The City of Lowell had the highest incidence of pedestrian and bicycle related crashes in the region. Tables 10 and 11 show the of pedestrian and bicycle crashes based on severity.

Table 11: Regional Bike Related Crashes by Severity and Community, 2013-2017

Community	Property Damage Only	Non-Incapacitating Injury Crashes	Incapacitating Injury Crashes	Fatal Crashes	Unknown / Not reported	Total
Billerica	7	9	2	0	1	19
Chelmsford	3	11	1	1	0	16
Dracut	13	9	1	0	3	26
Dunstable	0	1	0	0	0	1
Lowell	90	126	7	0	28	251
Pepperell	2	1	1	0	0	4
Tewksbury	4	10	3	0	0	17
Tyngsborough	3	2	1	0	0	6
Westford	3	11	0	0	0	14
Total	125	180	16	1	32	354

Source: NMCOG Crash Data

ADDRESSING SAFETY

Addressing Safety Through The TIP

The Northern Middlesex MPO works collaboratively with Federal, State, and local officials and stakeholders to address transportation safety throughout the region. Through development of a data driven, performance based approach to addressing safety, improvements throughout the region can be monitored and quantified to assess progress in achieving goals set in the Regional Transportation Plan. Through the TIP process, the NMMPO programs Federal funds for transportation projects in the region, thereby addressing identified safety issues in the TIP process.

Highway Safety Improvement Program and Strategic Safety Plan

Congress established the Highway Safety Improvement Program under SAFETEA-LU and continued it through FAST, in order to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The Highway Safety Improvement Program (HSIP) requires states to develop and implement a strategic highway safety plan, and to submit annual reports to the U.S. Secretary of Transportation that describe at least 5% of the state's most hazardous locations, show progress in implementing highway safety improvement projects, and evaluate the effectiveness of the projects in reducing injuries and fatalities.

A Massachusetts HSIP Task Force was established to develop guidelines for HSIP-eligible projects and programs. The Task Force consists of FHWA, MassDOT Highway, MassDOT Planning and the Regional Planning Agencies. In 2009, Massachusetts began obligating funds from the HSIP funding category and is now in the eleventh year of an active HSIP program.

In September 2018, the Commonwealth of Massachusetts updated its Strategic Highway Safety Plan (SHSP), which provides the framework, and specific goals and objectives for reducing highway fatalities and serious injuries on all public roads. The SHSP is a data-driven, comprehensive plan that integrates the four E's - engineering, education, enforcement and emergency medical services (EMS). The SHSP is developed in consultation with Federal, State, local and private sector safety stakeholders. Since the development of the first SHSP in 2006, highway fatalities in the Commonwealth have dropped by 19% and serious injuries have dropped by 44%. The Commonwealth's long-range goal is known as Vision Zero, which envisions zero fatalities on the State's roadways. The interim goals for 2022 are to reduce five-year average fatalities by 12% and serious injuries by 21%.

The primary goal of the SHSP is to decrease traffic-related fatalities and injuries through improvements in the following fourteen (14) strategic emphasis areas, each representing at least ten (10) percent of annual fatalities or severe injuries on Massachusetts roadways:

- Lane departures;
- Impaired driving;
- Occupant protection;
- Speeding/aggressive driving;
- Intersection crashes;
- Pedestrians;
- Older drivers;
- Motorcycles;
- Young drivers
- Truck/bus-involved crashes;
- Driver distraction;
- Bicycles;
- At-grade rail crossings; and
- Safety of persons working on roadways.

In addition to strategies for emphasis areas, five policies are recommended by the SHSP to help reduce the frequency and severity of roadway crashes. These are legislative measures are designed to address the interconnected nature of crashes, focusing on speeding, driver distraction and impaired driving. These include hands free laws, primary seat belts laws, work zone safety laws, ignition interlock for all OUI offenders, truck side guards, and automated enforcement authority for municipalities.

Table 12 below highlights projects in the NMCOCG Region that are currently receiving Highway Safety Improvement Plan (HSIP) funding.

Table 12: NMCOCG Projects Receiving HSIP Funding

Project ID	Project Description	Community	HSIP Funding Award	Current Programmed TIP Year	Project Status
606189	Route 38 Intersection Improvements at Four Intersections	Lowell	\$ 3,360,000	2018	Construction
608346	Intersection Improvements at Main Street, South Street and Salem Street	Tewksbury	\$ 2,916,249	2019	Construction
604964	Lowell Connector Reconstruction from Thorndike Street to Gorham Street	Lowell	\$ 1,014,000	2020	Construction
608774	Route 38 Intersection Improvements	Lowell/Tewksbury	\$ 3,360,000	2023	Design

Source: MassDOT

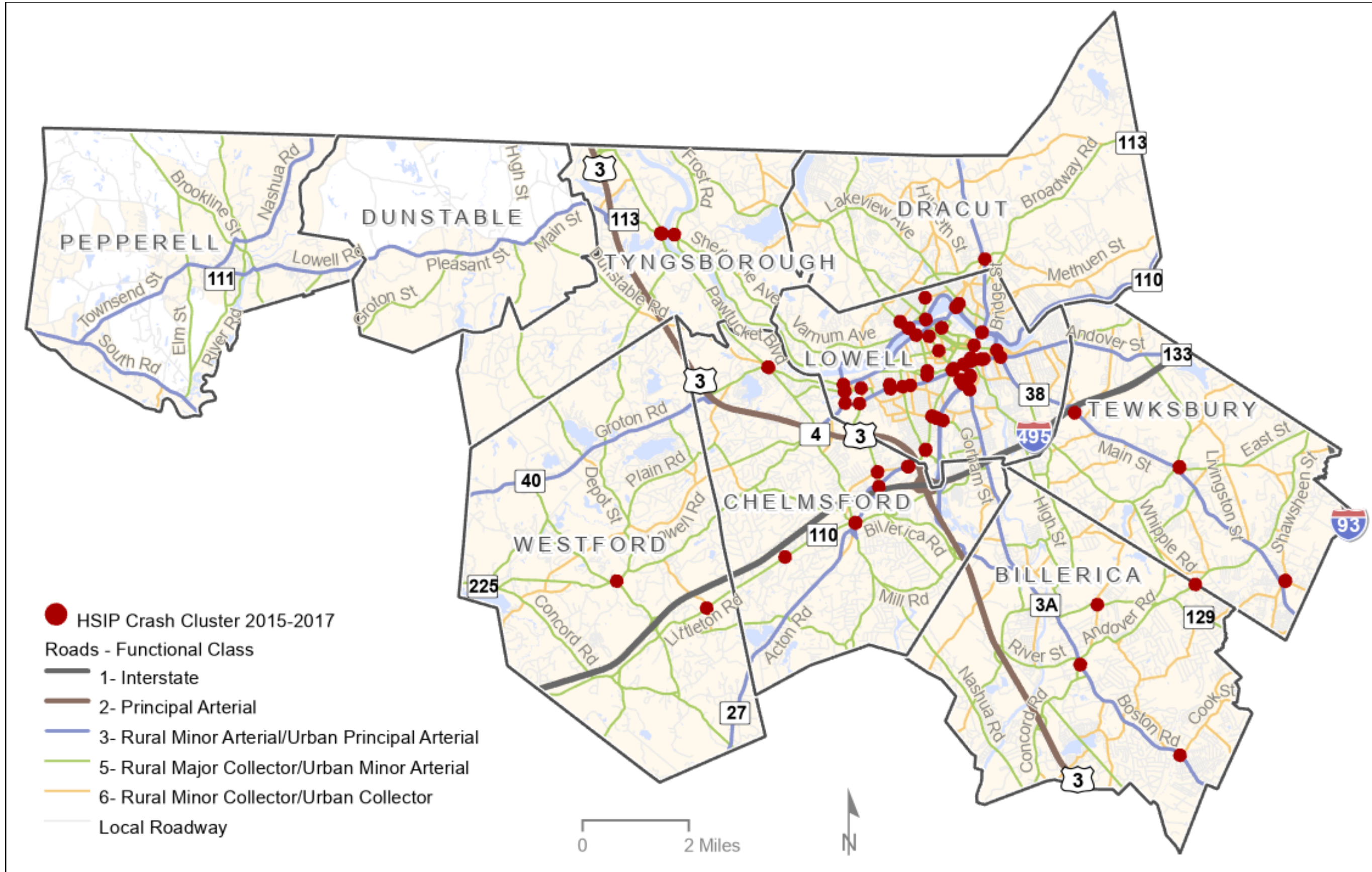
MassDOT's High Crash Cluster Method for Determining HSIP Funding Eligibility

MassDOT maintains an interactive map displaying the vehicular crash locations throughout the entire Commonwealth. The map is used by MassDOT to identify locations that are eligible for Federal assistance through the Highway Safety Improvement Program (HSIP). An HSIP-eligible location is a “crash cluster” that ranks within the top 5% within each region, based on a combination of factors, including crash incidence and severity. According to the MassDOT 2016 Top Crash Locations Report, crash clusters are determined using a 25-meter (82-foot) fixed search distance around each crash and merging nearby crashes together to create clusters.

Motor Vehicle Related Crash Clusters

Map 3 displays the high crash clusters located in the Northern Middlesex region. These locations are eligible for Highway Safety Improvement Program funding through the Northern Middlesex Transportation Improvement Program.

Map 3: MassDOT's Identified High Crash Clusters in the Northern Middlesex Region (2015-2017)

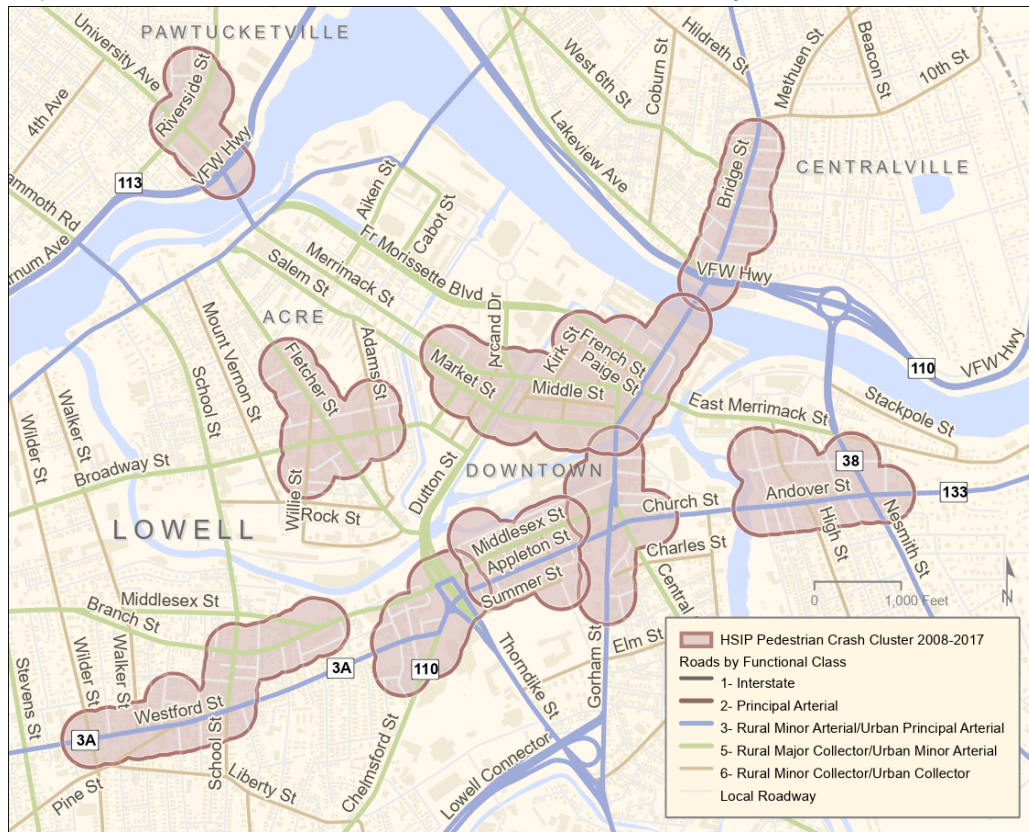


Source: MassDOT "Top Crash Locations" Portal: <https://gis.massdot.state.ma.us/topcrashlocations/>

Pedestrian Related Crash Clusters

Map 4 and Table 13 detail pedestrian related “crash clusters” for 2008-2017, as identified by MassDOT. Improvements at these locations are eligible for HSIP funding. All of the “crash clusters” are located within the City of Lowell.

Map 4: Pedestrian related “Crash Clusters” 2008-2017 as Identified by MassDOT



Source: MassDOT “Top Crash Locations” Portal: <https://gis.massdot.state.ma.us/topcrashlocations/>

Table 13: Pedestrian related “Crash Clusters” 2008-2017 as Identified by MassDOT

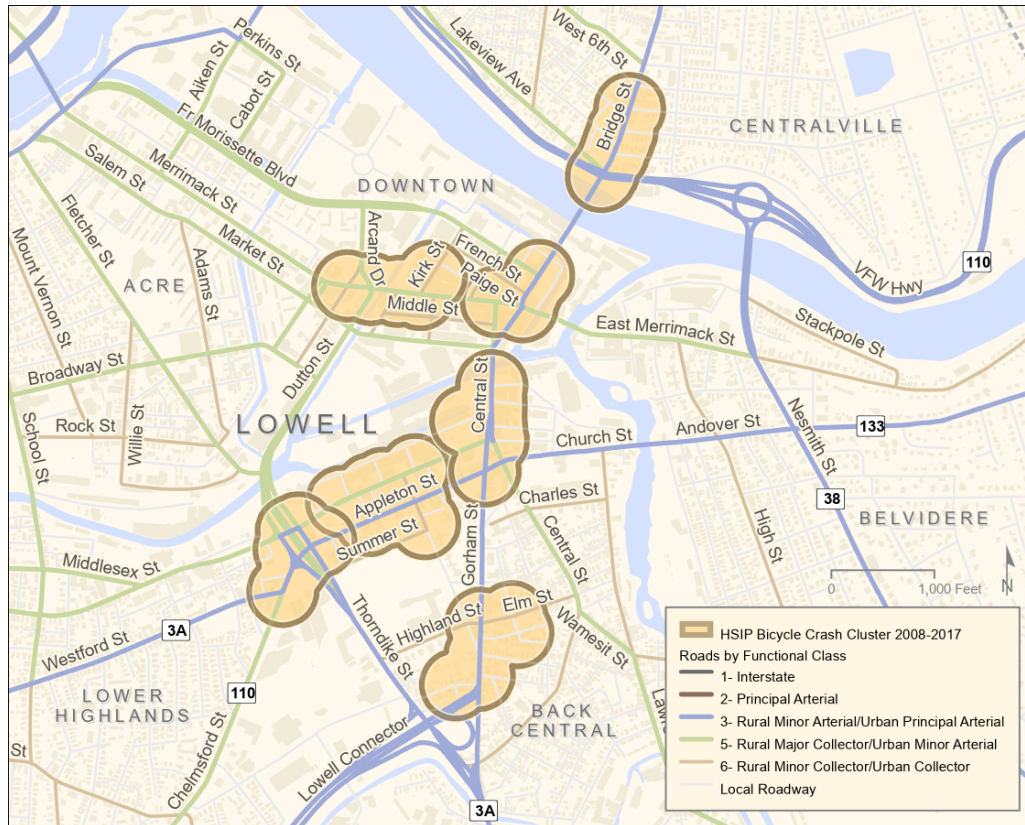
Intersection	Non-Injury Crashes	Non-Serious & Possible Injury Crashes	Fatal & Serious Injury Crashes	Pedestrian EPDO Score
Bridge Street from VFW Highway to 10th street	113	28	3	283
Merrimack Street/Market Street Lowell Downtown	48	43	10	363
Gorham Street/Central Street Corridor	23	28	1	173
Church Street/Nesmith Street	24	18	3	144
Appleton St/Middlesex st/Jackson St	8	9	5	103
Lord Overpass/Chelmsford St/Westford St	10	17	4	135
Middlesex St/Branch St/Westford St	20	2	4	70
Fletcher St/Broadway	13	9	3	88
University Ave/Riverside St	10	6	4	80

Source: MassDOT “Top Crash Locations” Portal: <https://gis.massdot.state.ma.us/topcrashlocations/>

Bicycle Related Crash Clusters

Map 5 and Table 14 detail bicycle-related “crash clusters” for 2007 through 2017, as identified by MassDOT. Improvements at these locations are eligible for HSIP funding. All of the “crash clusters” are located within the City of Lowell

Map 5: Bicycle-Related “Crash Clusters” 2008-2017 as Identified by MassDOT



Source: MassDOT “Top Crash Locations” Portal: <https://gis.massdot.state.ma.us/topcrashlocations/>

Table 14: Bicycle-Related “Crash Clusters” 2008-2017 as Identified by MassDOT

Intersection	Non-Injury Crashes	Non-Serious & Possible Injury Crashes	Fatal & Serious Injury Crashes	Bike EPDO Score
Bridge Street/VFW Highway	6	16	1	96
Kearney Square	4	8	1	54
Merrimack St/Dutton St/Arcand St	3	5	1	38
Central St	3	7	1	48
Jackson/Appleton/Middlesex	3	8	0	43
Lord Overpass/Chelmsford St	7	9	0	52
Gorham St/Lowell Connector	3	5	1	38

Source: MassDOT “Top Crash Locations” Portal: <https://gis.massdot.state.ma.us/topcrashlocations/>

Roadway Safety Audits Role in HSIP Funding Determination

The Federal Highway Administration (FHWA) defines a Road Safety Audit (RSA) as the formal safety examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. The RSA program was implemented in 2007, in accordance with the Commonwealth's role as a Lead State in preventing lane departure crashes, in conjunction with the SHSP. Since then, RSAs have become an integral part of the HSIP program in Massachusetts and the region.

HSIP guidelines state that "all HSIP candidate locations will require an accompanying RSA report, or an engineering or planning report to determine eligibility." Thus, the RSA program has expanded to encompass any location in the State identified as a high crash location. Additionally, if all or a portion of a project area is considered HSIP-eligible, an RSA must be conducted prior to submitting 25% design plans. Table 15 lists Road Safety Audits conducted in the Northern Middlesex Region. Many of the recommendations of these RSAs have been incorporated into construction projects programmed in the Northern Middlesex Transportation Improvement Program (TIP) using HSIP funding

Table 15: NMCOG Projects Receiving HSIP Funding

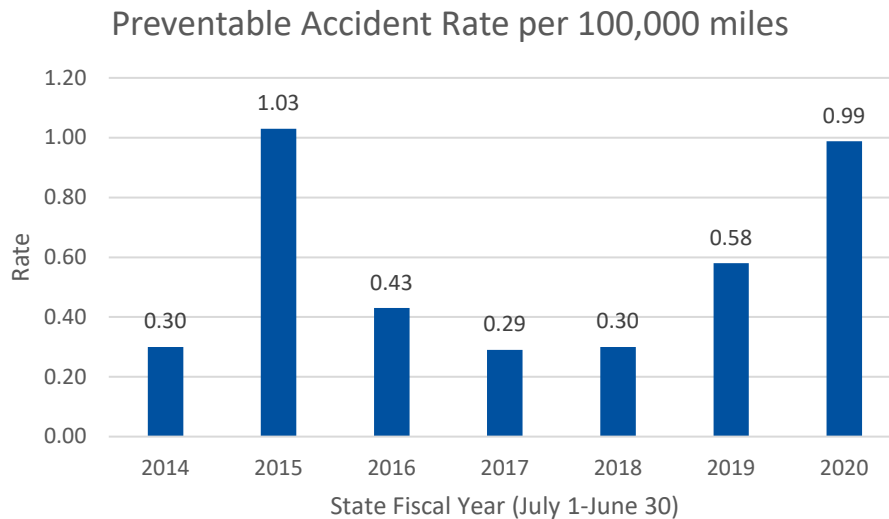
RSA Location	RSA Completion Date	Project Status
US Route 3 in Billerica and Chelmsford	2007	Construction Complete
Intersection of VFW Highway and Bridge Street in Lowell	2007	Construction Complete
VFW Highway Corridor in Lowell	2010	RTP Project recommendation FFY 2025-2029; Preliminary Design
Route 38 in Lowell	2010	Construction Underway
East Street at Livingston Street in Tewksbury	2011	Construction complete
Boston Road at Route 110 in Westford	2011	Construction complete
East Street/Dascomb Road at Shawsheen Street in Tewksbury	2011	Construction Complete
Route 40 at Oak Hill Road in Westford	2013	Construction Underway
Forge Village Road at Cold Spring Road in Westford	2014	Planning study underway by Town of Westford
Route 40 at Dunstable Road in Westford	2014	Construction Complete
Route 3A and Charnstaffe Lane in Billerica	2014	Construction Complete
Lowell Connector at Gorham Street in Lowell	2016	RTP Project recommendation FFY 2025-2029; Preliminary Design
Route 225 and Carlisle, Griffin Road in Westford	2016	Town response to residents complaining of cut through traffic
Pawtucket Boulevard at Wood Street (Rourke Bridge)	2017	Improvements made in conjunction with Rourke Bridge Replacement project
Bridge Street Corridor in Lowell	2017	In conjunction with City resurfacing project between VFW Highway and Sixth Street
Church Street in Lowell	2018	RTP Project Recommendation FFY 2025-2029 Preliminary Design
South/Salem/Main Street in Tewksbury	2018	Under Construction
Route 38 in Tewksbury	2018	Programmed on TIP for Construction in FFY 2023
University Avenue in Lowell	2019	RTP Universe of Projects

Source: NMCOG Regional Transportation Plan (RTP)

Transit Safety and Security For The LRTA System

The Lowell Regional Transit Authority (LRTA) is focused on providing safe public transportation systems and facilities for its riders and users. For the riding public, the LRTA maintains one of the newest bus fleets in the State. Vehicle maintenance is a priority and the addition of low-floor buses makes the service comfortable for senior and disabled passengers, while eliminating most of the mechanical problems associated with lifts for individuals with disabilities. Additionally, the vehicles are equipped with on-board video surveillance for added safety and security.

Figure 9: LRTA Preventable Accident Rate per 100,00 Miles



Source: LRTA Database

LRTA tracks preventable accidents per 100,000 miles as a safety performance measure. The National Safety Council defines a preventable accident as “one in which the driver failed to do everything that they reasonably could have done to avoid the accident”. Figure 9 above shows preventable accident data for the LRTA from 2014-2020. In general, preventable accidents occur more often during the winter months, when city streets are narrowed by the snow banks and cars are parked further into the roadway than is the case during the spring, summer and fall. In 2015, the severity of the winter season led to a higher than typical accident rate. Transit system security statistics are reported annually to the Federal Transit Administration through the National Transit Database submission and to the State through the Black-Cat reporting system.

LRTA Public Transportation Agency Safety Plan

Currently, the Lowell Regional Transit Authority (LRTA) is developing a regional Public Transportation Agency Safety Plan (PTASP), which details the safety processes and procedures for the Authority. The plan utilizes existing agency safety practices and best practices to be implemented to meet the new regulation set in 49 CFR Part 673.

The PTASP includes formal documentation to guide the agency in proactive safety management policy, safety risk management, safety assurance, and safety promotion. The goal is to provide management and labor with a comprehensive, collaborative approach to managing safety. The plan includes the process and schedule for reviewing the plan annually relative to safety performance measures and update processes that may be needed to improve the organization's safety practices.

The document is currently under review by MassDOT and the LRTA Advisory Board. The NMMPO will consider adoption of transit performance measures outlined in the PTASP, once approved by State and Federal partners.

Security of The Transportation System

There are many important transportation assets that are potentially vulnerable to security threats, including components of the transit, highway and intermodal freight system. Emergency response procedures are built largely from natural disasters and experience in responding to special disasters, such as the attacks of 9/11 and the Boston Marathon bombing. The response to terrorism occurs at many levels of government including local, regional, state and federal. Immediately after the terrorists' attacks on September 11, 2001, travel experience and behavior was forever altered. Transportation officials continue to evaluate ways to include security measures into the planning, design, implementation and operation of transportation facilities and services.

One of the most important lessons learned from past incidents is that effective and reliable communication among all levels of government is essential in responding to such disasters. Key agencies must work together to protect critical transportation assets, such as bridges and highway interchanges, enhance the region's traffic management capabilities and improve emergency response. Terrorists' objectives are assumed to be focused upon political, economic, or social disruption of our society through destruction and public demoralization. Transportation facilities could be targeted for attack, which would play a vital role in disaster response. Terrorists tend to select targets with symbolic value, with a history of targeting transportation vehicles, such as buses and trains, with explosives or gunfire. The tactics of terrorists continue to evolve, from isolated bombings to coordinated acts that create massive casualties. The World Trade Center attacks, as well as the attacks on Madrid's Commuter Rail system and London's Underground Subway systems are a few notable examples.

Transit and rail systems are regarded by law enforcement officials to be more likely terrorist targets

than highway structures. Terrorist threats to the transportation system could include:

- Structural/functional damages from explosives or fire
- Casualties from explosion or fire
- Facility or system shut down due to exposure or contamination from biological, radiological or chemical weapons
- Collateral damage to other services or infrastructure such as telecommunications, power and pipelines carried along roadways or bridges

The Northern Middlesex Council of Governments worked with the Federal Emergency Management Agency (FEMA), Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation and Recreation to develop a Regional Hazard Mitigation Plan to identify disaster risks and develop strategies for mitigation. The Plan focuses primarily on natural hazards, although it does address non-natural hazards as well. While the cause of a disaster may differ, there are many similarities in emergency response to natural disasters and acts of terrorism.

NMCOG implemented a “Pre-Disaster Mitigation Plan” for the region in 2006, which was revised and updated in 2015 and approved by FEMA. The plan outlines actions that could be taken to reduce the impacts of a natural disaster when and if they were to occur. Many of these mitigation measures would also help reduce the impacts of a possible terrorist attack. This plan could be modified to include additional supporting emergency operations plans for responding to security threats and incidents. In either a natural disaster or terrorism related event, the transportation network will be called upon to accommodate the following functions:

- Evacuate the population in the area of the event
- Provide emergency access to the site of the incident
- Allow the public to bypass the affected area
- Respond to the impacts of restrictions to access in the affected area

NMCOG assisted the Northeast Homeland Security Council in updating the Regional Homeland Security Plan, which included work in identifying critical infrastructure and evacuation routes within each community. As the refined emergency management plans continue to be developed, the Regional Transportation Plan may be amended to reflect identified priorities.

In response to the COVID-19 pandemic, the LRTA put together protocol for maintaining the safety of riders and drivers. This includes requiring both riders and drivers to wear masks while riding, asking anyone found loitering on the bus to deboard, and putting together a schedule for disinfecting all facilities throughout the system. Furthermore the LRTA conducts daily manager’s meetings and calls regarding COVID-19 and continues to run an awareness campaign.

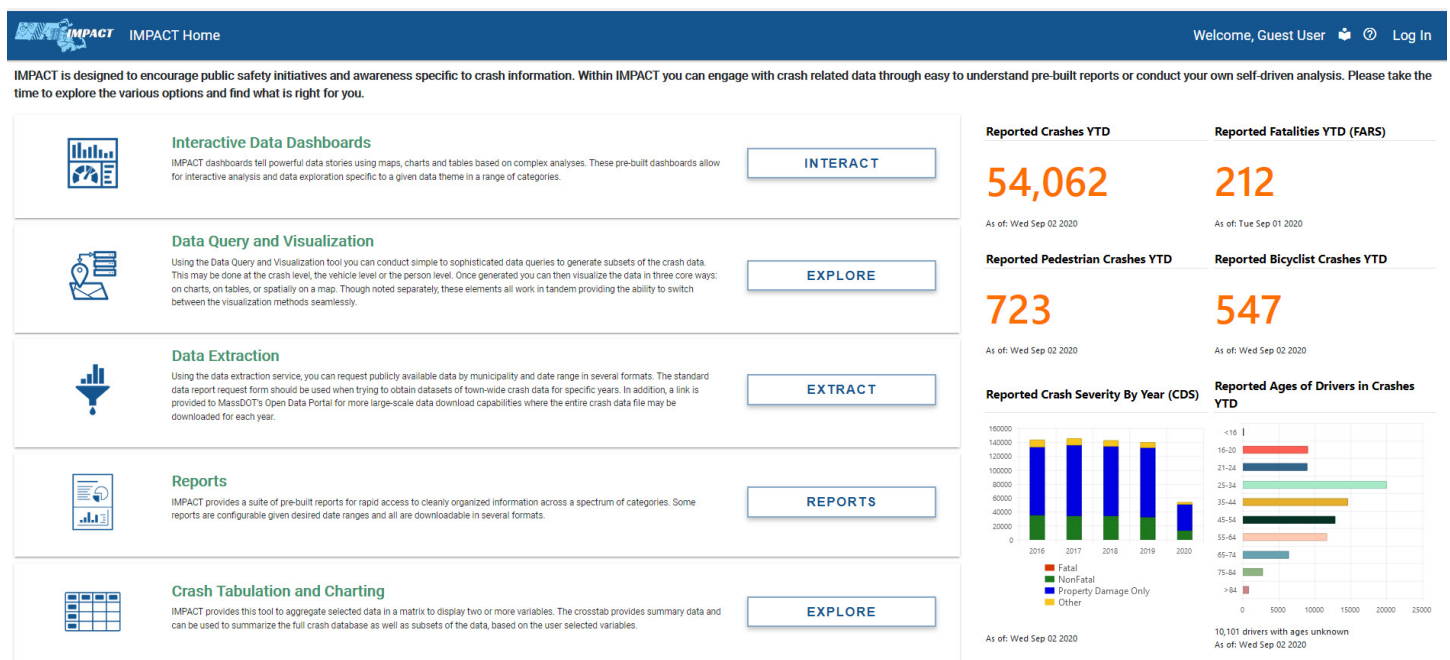
STATE SAFETY INITIATIVES

MassDOT Crash Portal

MassDOT launched their IMPACT online tool in early 2020. The tool was designed to encourage public safety initiatives that center around crash data. This portal tracks and analyzes crashes throughout the state and displays them on an easy to use map, providing data that goes as far back as 2002 and is updated daily.

The portal can be utilized in five different ways including: interactive data dashboards; data query and visualization; data extraction; report generation; and cross tabulation and charting. It can also be searched and displayed by state, Metropolitan Planning Organization, municipality or even as granular as a single intersection.

Image 1: MassDOT Crash Portal



Source: MassDOT IMPACT Portal: <https://apps.impact.dot.state.ma.us/cdp/home>

Complete Streets

A complete street is one that provides safe and accessible options for all travel modes – walking, biking, transit, automobile – and for all ages and abilities. While many existing roadways are designed to optimize automobile travel, the complete streets design requirement has sought to increase the role of non-motorized and transit options by providing continuous sidewalks, bicycle lanes, or wide shoulders. Instead of simply focusing on main streets or downtown corridors, a complete streets policy creates a safe, accessible environment throughout a transportation network. By increasing the recognition and importance of the pedestrian, bicyclist and public transit rider in roadway design and operation standards, complete streets policies are meant to ensure that safe travel options exist for all

users. MassDOT’s Project Development and Design Guide, which was published in 2006, embraces this approach to roadway design, and serves as a useful guide on how to implement the Complete Streets design approach.

Image 2: Example of a Complete Street



In 2013, MassDOT strengthened its Complete Streets approach by unveiling a Healthy Transportation Policy Directive that requires all state transportation projects to increase bicycling, transit, and walking options. The directive is intended to build a healthy, sustainable transportation system and to promote multimodal access for transportation customers. The directive builds on MassDOT’s mode shift goal, which calls for tripling the share of travel in Massachusetts by bicycling, transit, and walking by 2030. Together, these initiatives seek to improve service to transportation customers while improving the health of the public and natural environment. As part of the policy directive implementation, MassDOT reviews all projects currently in design to ensure they are consistent with the directive goals. Other elements of the directive include:

- All MassDOT facilities consider adjacent land uses and are designed to include wider sidewalks, landscaping, crossing opportunities, and other features to enhance healthy transportation options
- Reviews of cluster crash sites where incidents have occurred with healthy transportation users are conducted
- MassDOT provides a guide to assist communities proposing shared use paths on or along rail beds in order to accelerate the path design process.

Complete Streets Funding Program

The Complete Streets Funding Program was created with the intent of rewarding municipalities that demonstrate a commitment to embedding Complete Streets in policy and practice. The program assists eligible local communities in implementing and constructing bicycle and pedestrian facilities. In order to be eligible, a community must adopt a Complete Streets Policy and complete and submit a Complete Streets Prioritization Plan to the state. The process of achieving eligibility follows a three-tiered system, the completion of which will allow the community to receive Complete Streets funding for a project. The three tiers are:

1. The municipality demonstrates commitment by adopting a Complete Streets Policy by its highest elected official or board.
2. The municipality develops a Complete Streets Prioritization Plan, examining priorities that align with local and regional planning efforts. By completing Tiers 1 and 2, the Municipality is considered eligible to receive Complete Streets funding.
3. The Municipality identifies projects for competitive funding. MassDOT selects approved projects to be funded through the program.

The communities in the Greater Lowell Region have been very active in this program, with all of communities participating as of 2020. Dracut has approved policies, and Billerica, Dunstable and Pepperell have approved Prioritizations Plans. Five of the nine communities (Tewksbury, Lowell, Tyngsborough, Chelmsford, and Westford) have been approved or will be approved for project funding. Since 2016, eight Complete Streets grants have been awarded to the five communities in the Northern Middlesex Region. Table 16 describes the projects that have been funded and the amount of the grant awards.

Table 16: Regional Complete Streets Projects

Year	City/Town	Project Name	Project Description	Grant
2016	Lowell	Complete Streets Needs Assessment	NA	\$400,000
2016	Westford	Town Center Pedestrian Improvements	Construction of new sidewalk connection along Main Street and Boston Road to a new pedestrian crossing to the Town Common. Construction of a bumpout with ADA compliant wheelchair ramps to provide traffic calming at the intersection of Lincoln Street and Boston Road. Construction of pedestrian crossing safety improvements and ADA compliant wheelchair ramps at the entrance to Town Hall.	\$200,000
2016	Westford	Concord Road Sidewalk Construction	Construction of approximately 600' of sidewalk along Concord Road from an existing sidewalk to the Robinson School front door. ADA compliant wheelchair ramps and safety improvements at the intersection of Robinson Road. Construction of pedestrian safety improvements and ADA compliant wheelchair ramps at Concord Road/ Kelly Road intersection.	\$200,000
2017	Chelmsford	Crosswalk across North Road at Parkhurst	One additional crosswalk to line up with existing sidewalks on adjacent streets. Changes to traffic island, new ramps, changes to the signal cycle and additional pedestrian heads for the existing signal.	\$35,000
2017	Chelmsford	Billerica Road Sidewalk	Sidewalk and ADA improvements from Chelmsford Center School.	\$108,000
2017	Chelmsford	Richardson Road Multimodal Improvements	Sidewalk construction from Edgelawn Ave. to Princeton Street (Route 3A).	\$185,000
2018	Tewksbury	East Street – Chandler Street Sidewalk Improvements	East Street at Chandler Street intersection plus approximately 500 feet west and 300 feet east along East Street, and 200 feet north and south along Chandler Street	\$400,000
2018	Tyngsborough	Kendall Road (Rte. 3A) Improvement Project	Construction of ADA compliant sidewalks and curb ramps. Installation of a shared use path and rectangular rapid flashing beacons at upgraded pedestrian crossings, and intersection reconstruction to reduce travel speed and enhance pedestrian safety in the Town Common area.	\$396,631

Source: NMCOG Regional Transportation Plan (RTP)

Safe Routes to School

Massachusetts Safe Routes to School (SRTS) program is funded by the Federal Highway Administration (FHWA) under the FAST Transportation Alternatives Program (TA). It is a key initiative of the Healthy Transportation Compact. The program provides funding to improve the ability of primary and middle school students to walk and bicycle to school. Increasing the number of students who walk and bicycle improves students' health, reduces traffic congestion, and improves air quality. In 2009, 31 percent of children in grades K-8 lived within one mile of school. Of those, only 35% of these children usually walked or bicycled to school.* According to the US Department of Transportation, fewer than 16 percent of children walk or bicycle to classes. At the same time, school-related traffic can contribute more than 10 percent of morning rush hour traffic volumes in some communities, as well as significant air pollution.†

As shown in Table 17, the communities of Chelmsford, Dracut, Lowell, Tewksbury, Tyngsborough and Westford currently participate in the SRTS program.



Table 17: Safe Routes to School in the NMCOG Region

Community	School
Chelmsford	Byam Elementary School
	Center Elementary School
	Charles D. Harrington Elementary School
	Col Moses Parker School
	McCarthy Middle School
	South Row School
Dracut	Brookside Elementary School
	George H. Englesby Elementary School
	Greenmont Avenue School
	Joseph A. Campbell Elementary
Lowell	Abraham Lincoln
	Kathryn P. Stoklosa Middle School
	McAuliffe Elementary School
	Moody Elementary School
	Rogers STEM Academy
Tewksbury	Heath-Brook
	Loella F. Dewing Elementary School
	Louise Davy Trahan
	North Street
Tyngsborough	Tyngsborough Elementary
	Tyngsborough Middle
Westford	Abbot Elementary
	Blanchard Middle
	Crisafulli Elementary School
	Day Elementary School
	John Robinson Elementary School
	Nabnasset Elementary School
	Rita Edwards Miller Elementary
Stony Brook Middle School	

Source: NMCOG Regional Transportation Plan (RTP)

* National SRTS Center, 2011; http://guide.saferoutesinfo.org/introduction/the_decline_of_walking_and_bicycling.cfm

† Pedestrian and Bicycle Information Center, Safe Routes to School Guide, 2007

CONCLUSION: ROADWAY SAFETY ISSUES AND OPPORTUNITIES

NMMPO staff continues to study high crash locations in greater detail as part of the traffic safety program. In addition to work carried out at the regional level, local highway department personnel should be trained to collect information in the following areas, which can be utilized to make maintenance decisions and prioritize safety projects:

- Identify and report hazardous shoulder drop-offs
- Identify and report vegetation in highway rights-of-way, such as brush and shrubs that limit motorist sight distances
- Identify and report degraded signs and pavement markings
- Identify and report damaged, missing, or obsolete safety hardware such as guard rail or attenuation barriers
- Establish priorities and response times for inspecting, repairing, upgrading or replacing damaged hardware
- Develop temporary or emergency actions to mitigate the effects of damaged hardware; and
- Provide and implement work zone traffic control plans.

The NMMPO continues to work with local, regional, and federal partners to improve overall safety on the region's transportation network. By prioritizing projects that address known safety concerns, the NMMPO is striving to achieve the performance targets set and reported in the 2020 Northern Middlesex Regional Transportation Plan. Communities looking to participate in the process by initiating safety improvement TIP projects or conducting UPWP safety studies can contact NMMPO staff at jhoward@nmcog.org or (978) 454-8021.