

HSIP Project Selection Criteria

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program, under the Bipartisan Infrastructure law (BIL) with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. The overarching requirement that HSIP funds be used for safety projects that are consistent with the State’s strategic highway safety plan (SHSP) and that correct or improve a hazardous road location or feature or address a highway safety problem. For more details on HSIP, refer to the FHWA website: [Highway Safety Improvement Program \(HSIP\) | FHWA \(dot.gov\)](https://www.fhwa.dot.gov/hsip/)

The program has to be aligned with the Strategic Highway Safety Plan (SHSP). The MA SHSP was completed in December 2022 and approved by the Governor’s office. ([Massachusetts 2023 Strategic Highway Safety Plan \(SHSP\)](#)). The strategies include the following:

Focus Areas	Strategies
Implement Speed Management to Realize Safer Speeds	<ul style="list-style-type: none"> • Evaluate and adjust operating speeds through roadway designs that are self-enforcing consistent with the new 2022 MassDOT speed management approach • Develop and execute a procedure for target speed setting in all project types (e.g., roadway reconstruction, bridge, preservation, development, new roadways) • Amend Massachusetts regulations related to speed (expand the definition of a school zone, adjust speed limit setting, modify statutory speeds)
Address Top-Risk Locations and Populations	<ul style="list-style-type: none"> • Identify, initiate, and prioritize systemic projects involving top-risk locations • Identify, initiate, and prioritize systemic projects involving top-risk populations • Biannually update and disseminate information on locations and populations of top risk • Evaluate effectiveness
Take an Active Role to Affect Change in Vehicle Design, Features, and Use	<ul style="list-style-type: none"> • Identify opportunities for the state to champion safe vehicle designs and features to minimize injury severity with national, state, and local partners
Accelerate Research and Adoption of Technology	<ul style="list-style-type: none"> • Pursue research to test new approaches and identify new technologies for improving safety – including methods to screen and curb dangerous behaviors (e.g., drug impairment levels, testing tools) • Develop prospective pilots for automated enforcement for red light running, speed zones, and work zones • Expand data linkages to improve our understanding of risks related to serious crashes and opportunities for intervention • Evaluate and identify how roadway safety-related violation structure incentivizes or disincentivizes dangerous driving behavior and develop recommendations for changes
Double Down on What Works	<ul style="list-style-type: none"> • Address top crash locations • Expand the use of roadway pilots • Expand internal state workforce training to engage the state workforce to raise awareness about the Safe System Approach and educate/train on how to implement it in their work • Expand external trainings the state provides to amplify safety, Safe System, and best practices • Expand resources to municipalities • Get more safety equipment into the hands of road users (e.g., bicycle lights, car seats)

	<ul style="list-style-type: none"> • Expand data-driven targeted enforcement and high visibility police presence • Improve accessibility and linkage of relevant safety-related data to professionals and the public • Increase maintenance and operations • Increase Road Safety Audits • Provide a safe work environment for workers on roadways through increased training, education, awareness of incident management, and cutting-edge approaches • Implement proven safety countermeasures in all roadway projects • Develop, utilize, and provide guidance resources for effective selection and evaluation of improvements under both state and local jurisdictions • Improve post-crash care through improving cell service coverage, implementing new trauma triage guidelines, increasing services for those involved in crashes, and increasing data linkages
Implement New Approaches to Public Education and Awareness	<ul style="list-style-type: none"> • Develop new approaches, test to find what works, and implement a new type of comprehensive campaign that will have an impact on social norming/behavioral change on speeding, occupant protection, impairment, distraction, and seatbelts • Develop an educational opportunity when individuals interact with the Registry of Motor Vehicles (RMV) to renew or obtain a license or ID so they can learn about safety advances including roadway design, multimodal mobility, signs, and signals • Improve driver education and training for those under 18 and expand driver education for parent(s)/guardian(s) of those new drivers • Improve driver education for new drivers over 18 years of age and provide refreshers for drivers transferring a license from another state • Establish a state plan to communicate safety – including how we want media to talk about crashes

Based on the above strategies a spot improvement, at a particular location, or a systemic approach can be taken. According to FHWA, “The systemic approach to safety involves widely implemented improvements based on high-risk roadway features correlated with specific severe crash types. The approach provides a more comprehensive method for safety planning and implementation that supplements and compliments traditional site analysis. It helps agencies broaden their traffic safety efforts and consider risk as well as crash history when identifying where to make low cost safety improvement locations. Rather than managing risk at certain locations, a systemic approach takes a broader view and looks at risk across an entire roadway system.” As long as the systemic approach is addressing a safety concern raised in the SHSP and identified in one of the strategies, it is HSIP eligible. Top view Top risk locations through a statewide network screening process, refer to: <https://apps.impact.dot.state.ma.us/sat/NetworkEmphasisArea>

For spot improvements, the following criteria have been established:

- Locations must originate from a comprehensive list of the highest crash locations. The primary source of data will be the MassDOT database (which is based on the Registry of Motor Vehicle (RMV) Crash Data System) and the High Crash Locations report (which includes Intersections, Pedestrian and Bicycle Crash Clusters based on weighted severity of crashes that have been geolocated). However, RPA’s may use their own data that have been edited to more accurately rank locations within their Region. It is also recognized that there is often a time delay with the release of the crash data from the RMV. If more up-to-date crash data are obtained from an alternative source and the data show that a particular location would rank high on a Region’s ranked list, the location may be considered for eligibility in the HSIP program with approval from MassDOT.
- With the intent of the HSIP program to reduce the number of fatalities and serious injuries on Massachusetts’ roads, candidate projects must be locations where the data indicates a high incidence of crash severity. The Equivalent Property Damage Only (EPDO) index (crash weights based on crash costs where Property Damage = 1 Point; and injury / fatal crashes = 21 Points) or another

measure that focuses more on the fatalities and injuries, will continue to be preferred for ranking locations because it provides a comparative measure of severity. When feasible, expected crashes based on Safety Performance Functions and Empirical Bayes is preferred. If not, crash rate formulas (EPDO per Million Entering Vehicles or per million vehicle miles traveled) can be used to rank locations as this measure not only accounts for severity, but also exposure.

- All HSIP project spot candidate locations will require an accompanying Road Safety Audit (RSA) report, or similar report, to determine eligibility. The report must include a detailed analysis of crash data/crash reports/risks to identify the nature of the crash problem as well as identify appropriate corrective measures to address the problem. If the HSIP project utilizes the systematic approach, then a justification of the systematic approach will be required and will need to be based on data, as developed or approved by MassDOT.
- Candidate projects can be viewed on an interactive map by selecting the specific map or map layers to view: (<https://gis.massdot.state.ma.us/topcrashlocations/>):

Intersections – Intersections must be within the top 5% of all intersection crash clusters within the geographic boundaries of each region based on MassDOT’s statewide crash database, from a ranked list prepared by the RPA, or a combination of the two. Note that the MassDOT list is based on located crashes only.

The emphasis for project selection should be on those locations ranking highest on the list, reflecting the highest crash intersection clusters in terms of crash severity (injury and/or fatality). Selection of an intersection that ranks lower on the list is acceptable, however, there must be reasons provided as to why those higher ranked locations were not selected. Examples may include: lack of public support or political will to pursue the project; or, improvements are pending developer mitigation; etc.

The table below is based on MassDOT’s 2018-2020 crash data. It provides the total number of intersection clusters and the number of intersection clusters within the top 5% in each region. It is recognized that a ranked list, developed by an RPA, may more accurately reflect the specific locations in that Region, therefore the RPA ranked list may be used to reflect the top crash intersection locations within that region. If more up-to-date crash data are obtained from an alternative source and those data show that a location would rank higher on a Region’s ranked list, the location may be considered for eligibility in the HSIP program.

Intersections

RPA / MPO	Number of “Intersections”	Intersections in the Top 5%	Minimum Equivalent Property Damage
BRPC	369	19	>= 89
CCC	788	42	>= 93
CMRPC	1829	95	>= 117
FRCOG	146	8	>= 72
MAPC	7174	387	>= 108
MRPC	796	40	>= 96
MVC	34	2	>= 45
MVPC	1197	63	>= 111
NMCOG	1066	58	>= 119
NPEDC	36	3	>= 26
OCPC	1244	63	>= 178
PVPC	2391	121	>= 157
SRPEDD	2626	133	>= 122

Pedestrians - The pedestrian crash location cluster must be within the top 5% of all pedestrian crash locations (based either on the list provided by MassDOT or from the list prepared by the RPA). Note that the MassDOT list is based on located crashes only. In addition, a simple reason must be provided why

locations higher on the list are not selected. Based on the 2011-2020 crash data, the following table provides the number of pedestrian locations by RPA and the number of pedestrian locations within the top 5%. It is recognized that a ranked list, developed by an RPA, may more accurately reflect the specific locations in that Region, therefore the RPA ranked list may be used to reflect the top pedestrian crash locations within that region. If more up-to-date crash data are obtained from an alternative source and those data show that a location would rank higher on a Region's ranked list, the location may be considered for eligibility in the HSIP program.

Pedestrian Crash Locations

RPA	Number of Pedestrian Crash Locations	Locations in the Top 5%	Minimum Equivalent Property Damage
BRPC	70	4	>= 152
CCC	122	7	>= 130
CMRPC	252	13	>= 261
FRCOG	17	1	>= 340
MAPC	1812	92	>= 233
MRPC	82	6	>= 106
MVC	10	1	>= 190
MVPC	164	9	>= 213
NMCOG	155	8	>= 256
NPEDC	4	2	>= 43
OCPC	205	11	>= 211
PVPC	419	21	>= 254
SRPEDD	369	19	>= 318

Bicycles - The bicycle crash location cluster must be within the top 5% of all bicycle crash locations (based either on the list provided by MassDOT or from the list prepared by the RPA). Note that the MassDOT list is based on located crashes only. In addition, a simple reason must be provided why locations higher on the list are not selected. Based on the 2011-2020 crash data, the following table provides the number of bicycle locations by RPA and the number of bicycle locations within the top 5%. It is recognized that a ranked list, developed by an RPA, may more accurately reflect the specific locations in that Region, therefore the RPA ranked list may be used to reflect the top bicycle crash locations within that region. If more up-to-date crash data are obtained from an alternative source and those data show that a location would rank higher on a Region's ranked list, the location may be considered for eligibility in the HSIP program.

Bicycle Crash Locations

RPA	Number of Bicycle Crash Locations	Locations in the Top 5%	Minimum Equivalent Property Damage
BRPC	34	3	>= 84
CCC	147	10	>= 127
CMRPC	151	8	>= 131
FRCOG	13	1	>= 67
MAPC	1201	64	>= 168
MRPC	29	3	>= 84
MVC	10	1	>= 147
MVPC	78	6	>= 64
NMCOG	106	6	>= 149
NPEDC	16	1	>= 87
OCPC	79	4	>= 105
PVPC	326	18	>= 127
SRPEDD	193	11	>= 85

Rural – Massachusetts is comprised of approximately 90% urban areas and approximately 80% of the centerline miles are urban or higher order rural (approximately 20% of the statewide centerline miles are on rural collectors or rural local roadways). While the HSIP is a data driven process, due to the low HSIP Criteria Updated 6/12/2023

percentage of rural areas, rural locations may not be selected for HSIP projects. As such, Massachusetts does not have a dedicated set-aside High Risk Rural Roads Program (HRRRP) and, in fact, there is no longer a Federal HRRRP. However, if Massachusetts is subjected to the High Risk Rural Road Rule because the rural fatality rate has increased (MassDOT has been required to advertise HRRR projects) then, if a roadway is functionally classified as a rural major or minor collector or rural local road and the crash rate of that roadway exceeds the statewide average for the functional classification of that roadway, then this may be eligible as an HSIP project (provided a Road Safety Audit is conducted). The statewide average crash rate by functional classification is shown below. (<https://www.mass.gov/service-details/intersection-and-roadway-crash-rate-data-for-analysis>)

2021 Crash Rate by Federal Functional Classification
(crashes per million vehicle miles traveled)

Roadway Federal Functional Classification	Rural	Urban
Statewide	0.97	2.10
Interstate	0.45	0.81
Principal Arterial – other freeways and expressways	0.70	0.90
Principal Arterial – other	0.61	3.05
Minor Arterial	1.02	2.98
Major Collector	1.05	2.85*
Minor Collector	2.53	-
Local	1.41	2.50

* This rate is for all Urban Collector roads, including both Urban Major Collector and Urban Minor Collector roadways.

Top 5% segments – while crash rates are often used as a quick way to determine how a roadway segment is operating compared to other similar segment types, MassDOT has also attempted to use a more scientifically rigorous method. The crash-based network screening tool (<https://apps.impact.dot.state.ma.us/sat/HotSpotNetworkScreening>) is based on excess average crash frequency with an Empirical Bayes (EB) adjustment for five facility types on collectors and arterials: rural two-lane undivided segments, urban four-lane divided segments, urban four-lane undivided segments, urban two-lane undivided segments and urban two-lane divided segments for either all crashes or the fatal and injury crashes only. Segments are ranked from most to least excess crash frequency, calculated as the difference between expected and predicted average crash frequency, on both the Statewide and MPO/RPA level. Top 5% segments are also eligible for HSIP.

Other - There may be other crash types within a region that have not been identified as a state-wide issue and therefore, a ranking has not been prepared. Examples are locations involving weaving at interchanges, collisions with deer, etc. This criterion may be used as long as the RPA can justify a project based on providing the data that shows that this crash type and location is a priority within that Region and it can be tied to one of the strategies identified as part of the SHSP.

HSIP Project Selection Process

