

I-91 VIADUCT STUDY

Springfield, Massachusetts



INTERSTATE 91 VIADUCT STUDY

August 2018



Prepared for:

The Massachusetts Department
of Transportation

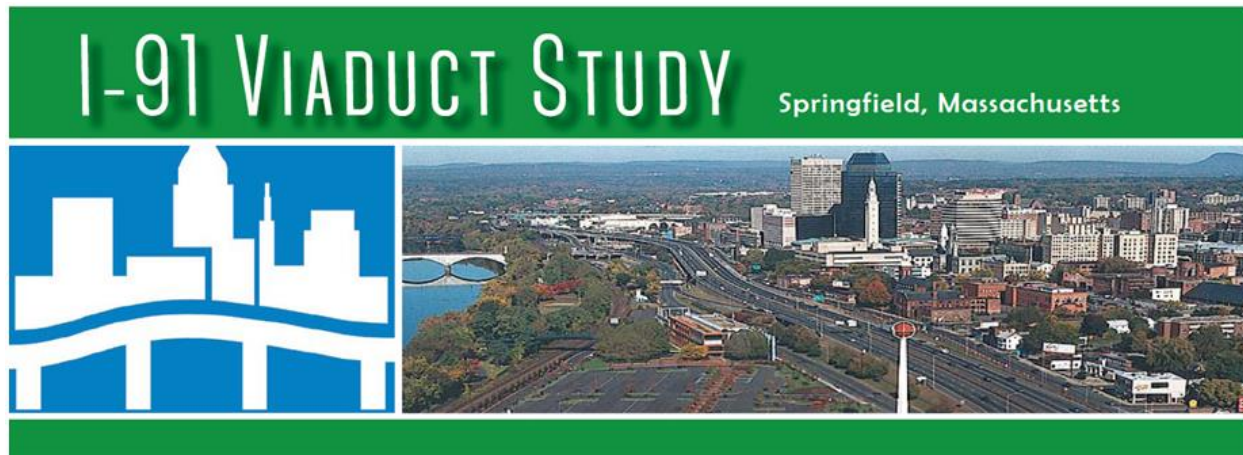
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INTERSTATE 91 VIADUCT STUDY

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I-91 VIADUCT STUDY

Springfield, Massachusetts



INTERSTATE 91 VIADUCT STUDY

CHAPTER I

STUDY AREA, GOALS AND OBJECTIVES, EVALUATION CRITERIA, AND PUBLIC PARTICIPATION

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1.1 PURPOSE AND NEED

The Interstate 91 Viaduct Study was initiated by the Massachusetts Department of Transportation (MassDOT) to address issues related to the elevated portion of Interstate 91 (I-91) known as the Viaduct, which parallels the Connecticut River in the city of Springfield. The Viaduct, along with the railroad, stands as a visual and physical divide between Downtown Springfield and the river. The Viaduct has historically required and will continue to require significant and costly ongoing repairs. To address the structural, financial, and socioeconomic issues that have become associated with the Viaduct, MassDOT initiated the present study. This study aims to develop and evaluate well-supported conceptual alternatives that focus on the issue of structural deficiency in the I-91 Viaduct while maintaining the efficiency of I-91 through the project corridor. Successful alternatives will improve overall safety and increase multimodal connectivity and accessibility between the Downtown Springfield urban core and the riverfront. Alternatives studied should consider the following:

- The I-91 Viaduct, along with the existing rail line, creates a physical and visual barrier between the city's neighborhoods, Downtown Springfield, and the riverfront, limiting access and adversely affecting quality of life for residents and the business community.
- Enhanced waterfront access and associated development can be expected to benefit both the local and regional economies.
- Ongoing maintenance costs associated with continual Viaduct repair need to be addressed.
- Local and regional economic growth is likely to occur as a result of the relocation of the Viaduct as newly available parcels are redeveloped and the land is repurposed, posing increased growth opportunities.

Concurrently with this study, MassDOT is initiating the replacement of the deck of the I-91 Viaduct between State Street and Interstate 291 (I-291) to address urgent safety needs as part of the I-91 Viaduct Rehabilitation Project. The deck replacement project is intended to ensure that the Viaduct remains a safe structure serving the city and region while a long-term vision for I-91 can be developed, evaluated, and subsequently implemented following this study.

1.2 STUDY BACKGROUND

Throughout Springfield's history, the area surrounding the I-91 Viaduct, the elevated segment of the interstate between State Street and the I-291 interchange, has been a residential, transportation, and economic center for the city. Initially, the primacy of the area was derived from its proximity to the Connecticut River, which provided a major north-south access route that connected Springfield, Holyoke, and Chicopee with Hartford to the south and Vermont to the north.

Development around the Viaduct area intensified in the railroad age when several rail lines crisscrossed the area. In the early 20th century, the transportation patterns of the area continued to evolve as U.S. Route 5 was routed along the east bank of the Connecticut River, crossing the river into West Springfield at the Memorial Bridge near Union Station. As automobile ownership rates increased, city dwellers

began moving into the suburbs, further driving demand for roadway improvements between communities.



Figure 1-1: 1868 Bowles Map of the Primary Study Area

On the federal level, the new concept of limited access expressways grew in prominence as traffic planners and politicians believed that these significant road improvements would aid economic growth, provide much-needed construction jobs, and facilitate national defense goals. Traffic volumes and congestion grew along U.S. Route 5 through the 1940s, and in 1953, the Massachusetts Department of Public Works and the Federal Bureau of Public Roads jointly planned major improvements to U.S. Route 5 that would include its relocation out of Downtown

Springfield. ¹The new alignment had U.S. Route 5 cross the river at the South End Bridge and run alongside the west bank of the Connecticut River in West Springfield. After the passage of the Federal Highway Act of 1956, the plans for highway development throughout the Pioneer Valley were altered to include a new superhighway, I-91.

Routing the interstate was a complicated and highly contentious matter that involved stakeholders from around New England and Washington, D.C. It was known that whatever alignment was chosen would potentially impact property values, natural resources, economic opportunities, and the community life of every municipality in and around its path. Initially, I-91 was planned to run along the west side of the Connecticut River for its entire length; however, several influential residents in a few neighboring Connecticut towns did not want the highway to run through their rural communities and lobbied officials heavily to back the plan to instead run the highway on the eastern side of the river, closer to the economic hub of the city of Springfield. The eastern highway route, which would run alongside the existing railroad, was opposed by many in the Springfield area that were concerned that the new alignment would require the demolition of an unnecessarily large number of residences and businesses within the city.

¹ Pioneer Valley Planning Commission. Interstate Route I-91 Corridor Planning Study, Springfield, Massachusetts: Interchanges 1 Through 5. Springfield, MA: Pioneer Valley Planning Commission, 2015. Digital resource: <http://www.pvpc.org/sites/default/files/I91ExistingConditionsE1toE5July15.pdf>

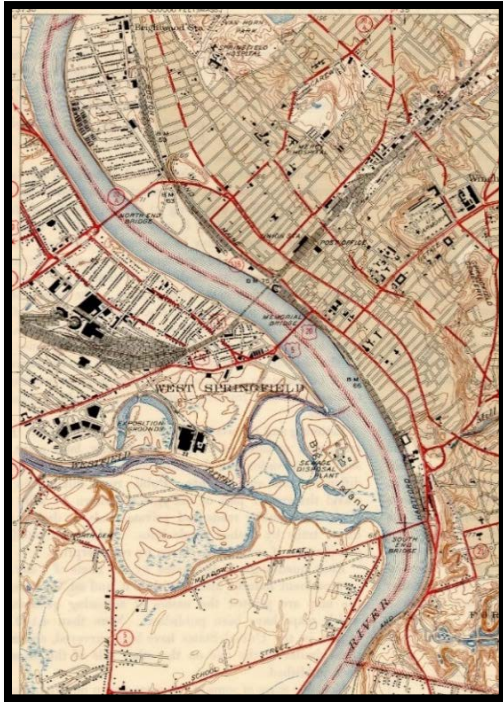


Figure 1-2: 1946 USGS Map of the Primary Study Area



Figure 1-3: 1958 USGS Map of the Primary Study Area

Other communities further north also opposed the east side alignment, such as the town of Whately on the west side of the river, where an abandoned section of rail line provided a highly suitable right-of-way for the interstate. Depending on their location, layout, demographic profile, and other factors, some other municipalities objected to or favored a proposed I-91 route through their community.

The Pioneer Valley Planning Commission's 2013 Existing Conditions Report for the *Interstate Route I-91 Corridor Planning Study* records the discussion in Springfield thusly:

"Concerned residents of the Forest Park neighborhood and Longhill Street took their case to court to protect the park and historic buildings from being torn down by the highway project. The result was that the interchange was pushed back to Longhill Street and the city received a settlement from the state for the land and museum building that was demolished to make room for the highway exit. A big debate about the routing of the highway through Springfield's North End neighborhood focused on the conflict it created with an urban renewal project already in place. Other restrictions included an existing major pumping station along the river's northern city section. The mayor was concerned about the potential displacement of 5,000 residents by the state's proposed freeway routing in the North End. The Columbus Avenue section of the highway used the right-of-way of the railyard to reduce demolition. The location of the bridge between Springfield and West Springfield was debated to maximize benefits of connecting to the Massachusetts Turnpike."

Controversy, complications, and the large populations involved caused the Springfield section of I-91 to be the last one completed, on December 8, 1970, at a cost of \$155 million.



Figure 1-4: 1958 Sunoco Road Map of the Primary Study Area

The city transitioned into a 9-to-5 business community, leaving higher levels of poverty, low-income housing, and building deterioration in the Downtown Springfield area.

With the highway routing set, construction of the Viaduct was initiated with the demolition of a one-block-wide corridor between Downtown Springfield, the railroad, and the adjacent Connecticut River. The high water table in Downtown Springfield along the river made construction of a depressed highway inconceivable and unfeasible at that time, thus the expressway was elevated through the area, creating a physical and visual barrier between the city and its riverfront. This 4,000-linear-foot elevated highway section, the Viaduct, is the primary subject of this study.

During the construction in the months and years that followed, I-91 brought tremendous changes to Springfield and the communities that surrounded it. In its first year of operation, traffic along the highway increased daily and was up 50% by the close of the year. Although traffic volumes and efficiencies increased on the highway, many long-standing retail and commercial establishments as well as residents who had the means to do so frequently relocated away from the highway.

All was not lost, however, as in the areas near to the new highway new and modern buildings were built, including the Civic Center, the post office, and the Baystate West Mall. New small-scale developments coalesced around the newly created highway exits, further decentralizing commercial activity away from Downtown Springfield. However, increased traffic noise and emissions encroached on the once-serene Forest Park and historic residential neighborhoods, and the character of Downtown Springfield was significantly altered by the physical prominence of the vertical highway infrastructure. Traffic was routed onto the new highway, away from the old highway and local arterials, which in turn reduced congestion on local roads. However this negatively impacted local businesses by reducing the number of patrons and customers.

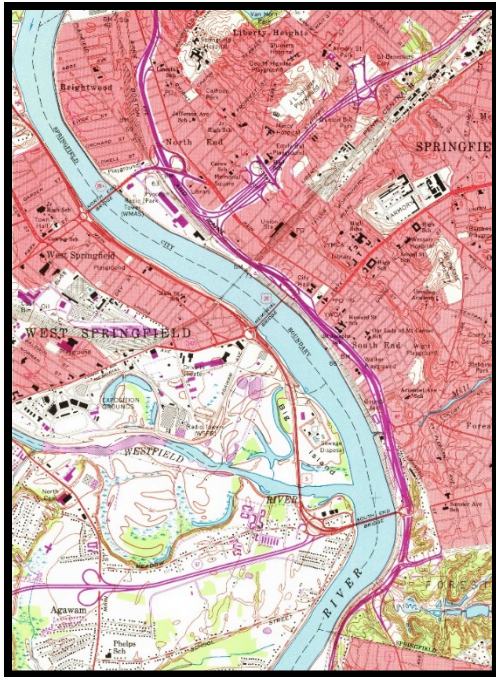


Figure 1-5: 1970 USGS Map of the Primary Study Area

In the decades since its construction, harsh New England winters have taken a toll on the Viaduct. Over the past 25 years, several rehabilitation projects have been completed on the Viaduct's structures; however, MassDOT has recently concluded that based on recent inspections the Viaduct's bridge decks now require wholesale replacement. The ongoing repairs that the Viaduct has required since its construction have entailed significant costs and have not achieved the maximum desired service life for this portion of the interstate.

As this study is being conducted, MassDOT is carrying out a major rehabilitation of the I-91 Viaduct in Springfield to be completed in 2018. Primarily, the project will include the complete replacement of the bridge decks, but it will also entail the painting and repair of structural steel, the replacement of bearings, improvements to the bridge drainage and highway lighting, comprehensive traffic management, and other safety improvements in problem areas such as the I-291/I-91 merge. This deck replacement project will keep the Viaduct safe and serviceable for the immediate future while the planning for the extended future of the corridor is carried out.

In addition to these ongoing structural issues, the Viaduct's overall physical presence has also not remained consistent with the City of Springfield's vision for these neighborhoods or the community as a whole. In recent years, the city has embarked on a number of studies exploring opportunities to redevelop its urban core and riverfront. Overall, these studies have concluded that I-91's current alignment adversely impacts tourism and creates a disconnect between the city's neighborhoods, Downtown Springfield, and the riverfront. Concurrently, the New Haven-Hartford-Springfield rail corridor is being improved and modernized, and Union Station has been renovated. One important aspect of these improvements is enhancing pedestrian and bicycle mobility and safety as well as

intermodal connectivity around the station. Some of the studies examining these ongoing issues include the following:

- *From the Quadrangle to the River: Revitalizing the Heart of Downtown Springfield – UMASS, Amherst Scholar Works*
- *An Advisory Services Panel Report – Springfield Massachusetts – Urban Land Institute*

1.3 STUDY AREA

The Study Area is a vital component of this study's framework. The Study Area for the I-91 Viaduct Study consists of two levels: (1) the Primary Study Area (Figure 1-6), which includes the area where potential physical transportation system improvements are being considered, and (2) the larger Regional Study Area (depicted along with the Primary Study Area in Figure 1-7), which includes major roadways, intersections, interchanges, transit facilities, and land uses that affect the Primary Study Area and may be impacted by any of the developed alternatives. At the outset of the study, the Primary Study Area included only the I-91 Viaduct and its adjacent streets within the city of Springfield. The Primary and Regional Study Areas were discussed extensively at the initial Working Group Meeting on November 5, 2014, where a number of Working Group members advocated for the Primary and Regional Study Areas to be extended southerly to the Connecticut state line to include the section of I-91 known as the "Longmeadow Curve" and its related on and off ramps. The Longmeadow Curve presents considerable operational issues for the corridor, and the potential realignment of the Viaduct could impact the Curve.

1.3.1 PRIMARY STUDY AREA

The limits of the Primary Study Area include the I-91 highway corridor from the I-291 interchange in the north to the Connecticut state line in the south, plus the roadways immediately surrounding the interstate to the north, east, and west: Bond Street and Route 20 to the north, Chestnut Street to the east, and U.S. Route 5 to the west. The Primary Study Area also includes the Connecticut Riverwalk and Bikeway and expands west over the South End Bridge (U.S. Route 5) into the town of Agawam, including the Route 57 rotary. Throughout the study process, the study team will evaluate motor vehicle, pedestrian, and bicycle transit operations as well as other transportation forms under a range of roadway configurations and development scenarios within the Primary Study Area.

Roadway segments in the Primary Study Area include the following:

- I-91
- I-291
- West Columbus Avenue
- East Columbus Avenue
- Main Street
- Dwight Street
- Chestnut Street
- State Street

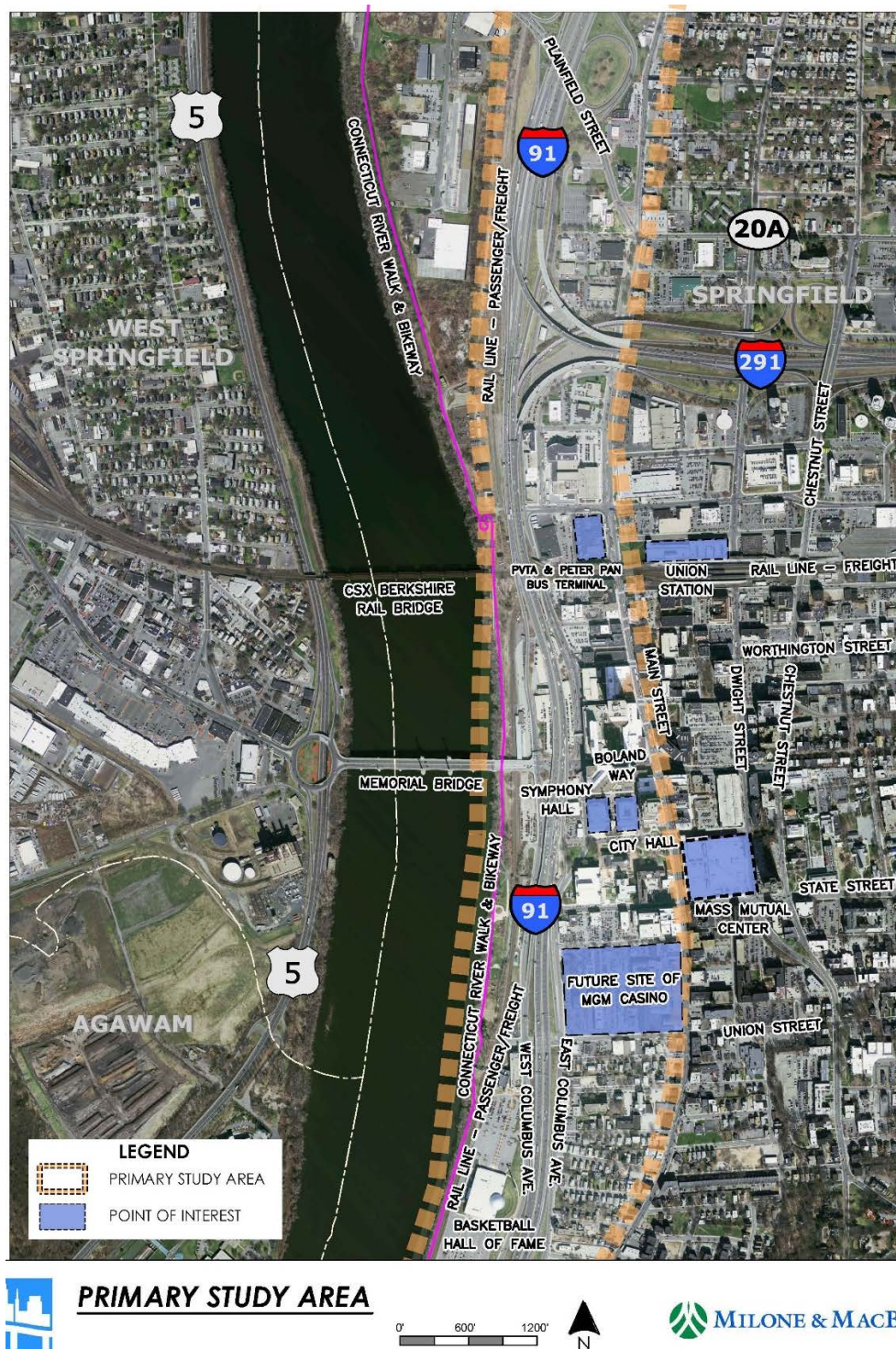


Figure 1-6 : Primary Study Area

1.3.2 REGIONAL STUDY AREA

The purpose of establishing the Regional Study Area is to enable the study team to do the following:

- Identify the role and function of the transportation infrastructure within the Primary Study Area as it relates to the regional multimodal transportation network
- Evaluate the indirect impacts of study alternatives beyond the Primary Study Area

The larger regional element of the analysis is measured primarily in terms of vehicular level of service at major roadways, interchanges, and intersections as well as in measures of systemwide efficiency such as vehicle miles traveled and vehicle hours traveled. The Regional Study Area is roughly bounded by the following:

- I-91 from the Connecticut state line in the south to Exit 16 (Route 202) in the city of Holyoke to the north
- I-90 from Exit 4 (I-91) in the town of West Springfield to the west to Exit 6 (I-291) in the city of Chicopee to the east
- I-391 for its entire length from I-91 in the city of Springfield to High Street in the city of Holyoke
- I-291 for its entire length from I-91 in the city of Springfield to Burnett Road in the city of Chicopee
- U.S. Route 5 from the Connecticut state line in the south to I-91 Exit 13 in the city of West Springfield to the north

Within the boundary described above, the Regional Study Area includes roadway facilities, intersections, and interchanges along the following roads:

- U.S. Route 5 between the Connecticut state line and Route 202 in Agawam, West Springfield, and Holyoke
- I-91 between the Connecticut state line and Exit 14 in West Springfield
- I-90 between Exits 4 and 6 in Chicopee and West Springfield
- I-291 between I-91 and I-90 in Springfield and Chicopee
- I-391 between I-91 and High Street in Holyoke and Chicopee
- Routes 20 and 20A from U.S. Route 5 in West Springfield to I-291 in Springfield
- Route 141 from Route 116/Chicopee Street to I-291 in Chicopee and Springfield
- Route 33 (Memorial Drive) between Route 141 and I-90 in Chicopee
- State Street from I-91 to Boston Road in Springfield
- Chestnut Street from I-291 to Maple Street in Springfield
- Dwight Street from I-291 to Maple Street in Springfield
- Main Street from ALT 20 to I-91 and West Columbus Avenue in Springfield
- Route 20 from Park Street in West Springfield to Main Street in Springfield

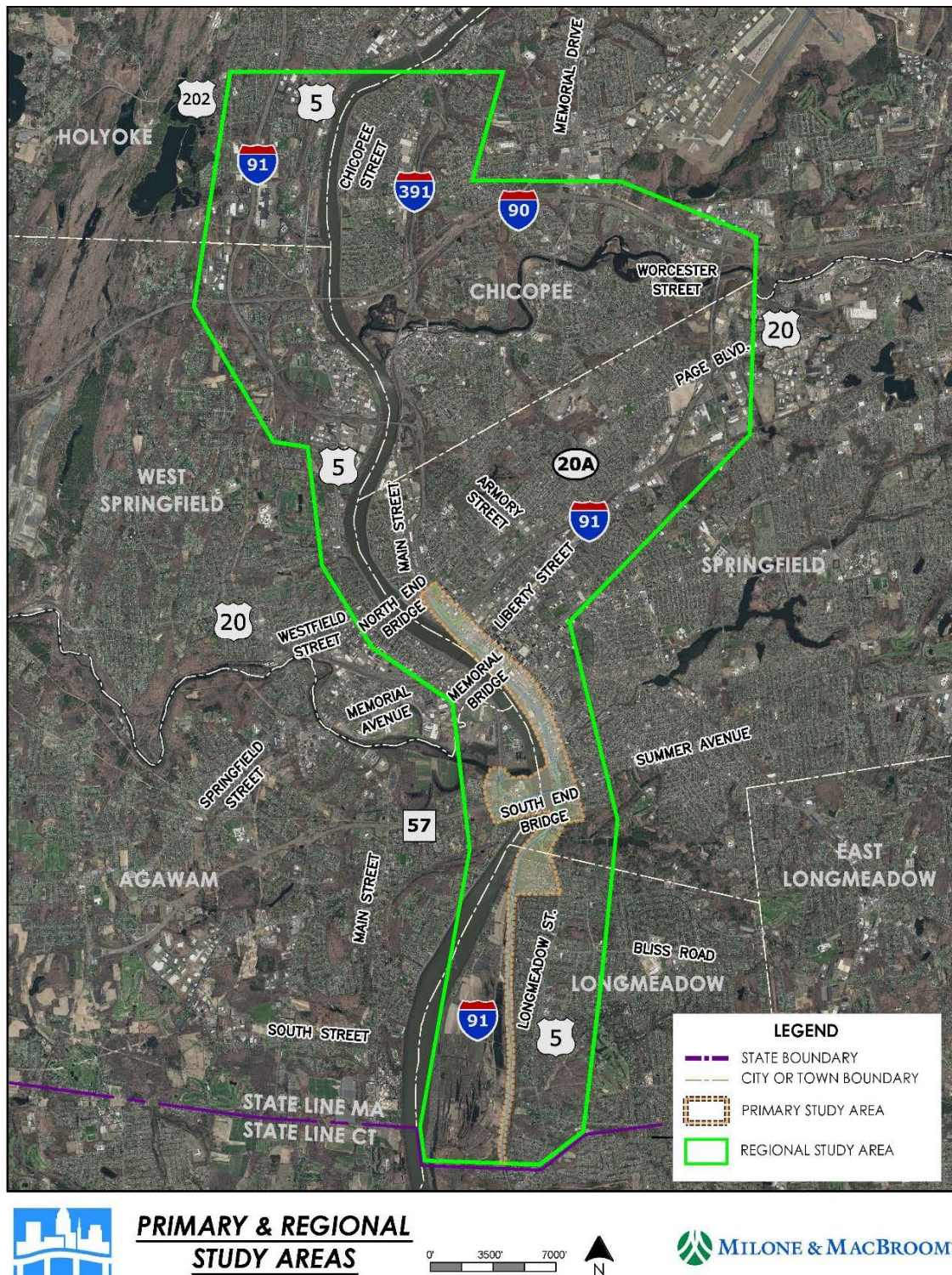


Figure 1-7: Primary and Regional Study Areas

1.4 GOALS AND OBJECTIVES

Goals and objectives for the study were developed by the study team in conjunction with the Working Group. The goals are meant to summarize and define favorable outcomes of the study. The objectives define how the goals will be achieved. Jointly, the goals and objectives outline the study's structure, which directs the progress and assessment of conceivable transportation improvements.

The goals and objectives for the study area are listed below:

GOAL 1:

Maintain and improve the safe and efficient function of I-91 and the local street network within the project study area while significantly improving the connection between the Downtown Springfield urban core and riverfront.

OBJECTIVES:

- Maintain or improve highway operations and safety: I-91 north and south, I-91 and I-291 interchange, I-291 on and off ramps within the Primary Study Area.
- Maintain or improve functionality, level of service, and safety at key intersections within both the Primary and Regional Study Areas.
- Enhance entrances/access points to the city of Springfield from the west (Memorial Bridge) and the riverfront.
- Enhance and create new Americans with Disabilities Act (ADA)-compliant pedestrian (walking, jogging, bicycling, rollerblading, strollers, etc.) connections from Downtown Springfield (neighborhoods and business center) to the riverfront as well as to the Hall of Fame and Union Station.
- Coordinate with the Knowledge Corridor improvements and operations.

GOAL 2:

Improve the quality of life for city residents in surrounding neighborhoods, existing/future business owners, daily commuting workforce, and visitors to the city of Springfield and surrounding communities.

OBJECTIVES:

- Create multimodal accommodations at street level for safe mobility to and from key destinations in conjunction with corridor improvements.
- Create more attractive, economically viable waterfront connection(s).
- Enhance access to existing development parcels and create new development parcels.
- Minimize environmental impacts (air, water, noise).
- Provide fair and equitable treatment for Environmental Justice populations.

- Enhance intermodal connectivity (passenger vehicle, bus, rail, and parking).
- Improve the overall visual presence of the interstate for the community(s) traversed or served.

1.5 EVALUATION CRITERIA

The evaluation criteria are specific considerations or measures of effectiveness used to assess benefits and impacts of the different alternatives established during this study. The evaluation criteria are based on the defined goals and objectives. As shown in Table 1-1, eight general evaluation categories were established and confirmed by the Working Group to be consistent with the study goals and objectives.

TABLE 1-1 Evaluation Criteria, Categories, and Corresponding Goals	
Evaluation Criteria Category	Corresponding Project Goal
Mobility and Safety	Maintain or improve the safe and efficient function of I-91 and the local street network within the Regional Study Area while significantly improving the connection between the Downtown Springfield urban core and the riverfront.
Health and Environmental Effects	Improve the quality of life for city residents in surrounding neighborhoods, existing/future business owners, daily commuting workforce, and visitors to Springfield and surrounding communities.
Connectivity/Accessibility	Maintain or improve the safe and efficient function of I-91 and the local street network within the Regional Study Area while significantly improving the connection between the Downtown Springfield urban core and the riverfront.
Land Use and Economic Development	Improve the quality of life for city residents in surrounding neighborhoods, existing/future business owners, daily commuting workforce, and visitors to Springfield and surrounding communities.
Community Effects	Improve the quality of life for city residents in surrounding neighborhoods, existing/future business owners, daily commuting workforce, and visitors to Springfield and surrounding communities.
Cost	A key factor supporting both project goals and objectives

These evaluation criteria, which are based on measurable and specific measures of effectiveness, will be used to determine the best results for the defined goals and objectives. The detailed list of evaluation criteria and corresponding measures of effectiveness is presented in Table 1-2.

TABLE 1-2: Evaluation Criteria	
Evaluation Criteria	Measure of Effectiveness
Mobility	
Roadway Operational Functionality	<ul style="list-style-type: none"> • Intersection delay and level of service • Volume to capacity ratio • Calculated 50th and 95th percentile queues • Merge, diverge, and weaving level of service • Highway and ramp level of service
Travel Time	<ul style="list-style-type: none"> • Vehicle hours traveled • Average travel time through the Primary Study Area • Average travel time within the Regional Study Area • Overall network delay
Safety	
Bicycle Safety	<ul style="list-style-type: none"> • Provision of designated facilities • Number of conflicts with vehicles
Pedestrian Safety	<ul style="list-style-type: none"> • ADA compliance • Intersection crossing times • Number of conflicts with vehicles
Vehicular Safety	<ul style="list-style-type: none"> • Conformance with American Association of State Highway and Transportation Officials (AASHTO) and MassDOT standards • Emergency vehicle access
Health and Environmental Effects	
Sustainability	<ul style="list-style-type: none"> • Impacts to environmental resources • Impervious area – net changes • Low impact design standards (LID) • Areas of open space/development • Tree impacts lost versus gained
Air Quality	<ul style="list-style-type: none"> • Total emissions
Noise	<ul style="list-style-type: none"> • Vertical positioning of alternatives
Connectivity/Accessibility	
Mobility	<ul style="list-style-type: none"> • Vehicular connectivity between landmarks • Walkability between landmarks
Land Use and Economic Development	
Land Use Patterns	<ul style="list-style-type: none"> • Mixture of land use created
Economic Development Potential	<ul style="list-style-type: none"> • Acres of vacant land can be reversed. • Square footage of existing space redeveloped • Spillover development generated by riverfront and landmark connectivity
Socioeconomic Impacts	<ul style="list-style-type: none"> • Number of new jobs • Number of new residents

	<ul style="list-style-type: none"> • Change in consumer spending • Change in household income/earnings
Enhancements	<ul style="list-style-type: none"> • Square footage of public green space • Changes to built form (quantitative)
Fiscal Impacts	<ul style="list-style-type: none"> • Generated disposable income • Property tax generation/revenue
Community Effects	
Pedestrian and Bicycle Accommodations	<ul style="list-style-type: none"> • Access points to riverfront and landmarks • Pedestrian delay • Linear feet of sidewalks • Linear feet of bike paths • Increased safety measures for pedestrians and bicyclists
Vehicular Accommodations	<ul style="list-style-type: none"> • Connections from Downtown Springfield to the riverfront • Redistribution of daily traffic and peak hours
Visual Impacts	<ul style="list-style-type: none"> • River and skyline views • Landscaping opportunities • Open space • Recreational opportunities
Multimodal Travel	<ul style="list-style-type: none"> • Increased transportation choices • Decreased traffic congestion • Modal conflict net changes • Conflicts with transit routes • Modal split
Construction Impacts	<ul style="list-style-type: none"> • Duration • Closure and detours • Right-of-way impacts • Effects on local businesses including access
Parking	<ul style="list-style-type: none"> • Reduction in parking areas • Add parking spaces or facilities
Compatibility	<ul style="list-style-type: none"> • Cohesiveness with in-place local and regional plans
Cost	
Construction Costs	<ul style="list-style-type: none"> • Arterial route upgrades • Right-of-way impacts • Order-of-magnitude implementation costs • Maintenance costs • Utility impacts

1.6 PUBLIC INVOLVEMENT PLAN

A public involvement plan was developed with the goals of soliciting input, garnering public support, and resulting in a project completed to the community's satisfaction. A transparent, inclusive, and responsive public involvement program is intended to advance the project in a timely manner and avoid obstacles caused by lack of information or opportunities to participate. The goals of the plan include the following:

- Reaching out early and frequently so people can participate in the study process
- Developing and maintaining positive relationships with community leaders, residents, and stakeholders
- Providing opportunities for public involvement, including information gathering, promptly responding to questions/inquiries, and offering an opportunity to submit comments
- Communicating study news and updates across several platforms in easy-to-understand and accessible formats. Translations into Spanish and additional languages or formats will be utilized to reach all populations. All materials posted to the website will be compliant with Web Content Accessibility Guidelines (WCAG) 2.0 and Section 508.
- Collaborating with community and advocacy groups, businesses, residents, and local officials to effectively broaden the public involvement program in part by convening a Working Group consisting of local, state, regional, legislative, federal, and business community representatives
- Encouraging and maintaining project support and involvement by providing continuous and meaningful opportunities for all potentially affected communities to participate and provide feedback

1.6.1 STAKEHOLDER DATABASE

The study team's stakeholder database for the project includes the local business community, elected and local officials, community groups, media, individuals and groups who have attended public meetings or hearings, property owners within the Primary Study Area, planning commissions, industry organizations, agency departments, and community organizations. These stakeholders include entities located in and around Springfield, West Springfield, Chicopee, Agawam, Holyoke, and Longmeadow (a complete list of stakeholders is included as in Appendix K to this report.)

1.6.2 INTERNET COMMUNICATIONS

Study updates, meeting announcements, and other project information are communicated electronically via the project website, e-blasts, and social media. The project website (www.massdot.state.ma.us/i91viaductstudy/home.aspx) is continually updated with documents, meeting announcements and materials, and graphics as they are created.

1.6.3 PUBLIC MEETINGS

The project's public involvement plan includes three public meetings to be held at dates that correspond with major project milestones. At these public meetings, attendees have an opportunity to view data, maps, and other materials; ask questions of the study team; and provide feedback.

1.6.4 WORKING GROUP MEETINGS

A critical component of the study is the Working Group, a group of stakeholders representing local, regional, and federal organizations, with a strong focus on neighborhood and community groups, business and local advocacy groups, planning organizations in the Pioneer Valley, and transit agencies such as Amtrak, Amtrak Railroad, Pioneer Valley Transit Authority (PVTa), and Peter Pan Bus. Given the diverse needs and objectives that are encompassed by the organizations represented, the members of the group are tasked with the challenge of providing balanced viewpoints within the ongoing study and serving as communication conduits to the communities and entities that they represent.

The study time line includes 10 Working Group Meetings that correspond to key project milestones. The purpose of these meetings is to solicit input from the members and afford them an opportunity to provide feedback on work completed. Below are the Working Group meeting topics:

Figure 1-8: Working Group Meeting Topics

Working Group Meeting	Topic	Meeting Date
1	Study area limits, goals and objectives, evaluation criteria, public involvement plan, the task milestones, and overall schedule	November 5, 2014
2	Existing conditions (draft)	April 9, 2015
3	Existing conditions (final), future No-Build conditions, issues evaluation components, task milestones, and overall schedule	August 3, 2015
4	Future-year conditions, project milestones, and overall schedule	mid November, 2015
5	Constraints identification and strategy for Public Meeting #1	December 15, 2015
6	Alternatives development components and strategy for next public meeting	October 26, 2016
7	Elements of alternatives analysis and cost analysis components	June 20, 2017
8	Study recommendations as a result of the analysis	May 31, 2018
9	Final report	August, 2018

1.6.5 PRESS OUTREACH

Springfield area press representatives are included in the public outreach database that receives general information via ongoing email blasts. The study team provides draft media and press releases to MassDOT Public Affairs for distribution to broadcast, online, and print media outlets and in response to press inquiries.

1.6.6 COORDINATION WITH OTHER PROJECTS

The study team partners with MassDOT's I-91 Viaduct Rehabilitation Project Team to avoid public confusion and coordinate outreach efforts whenever possible.

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