

# MassDOT Bridge Program Update

*February 28, 2024*



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# Bridge Inventory

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## Types of Bridges

NBI Bridges (5,173) – National Bridge Inventory

Span greater than 20' (DOT & MUN)

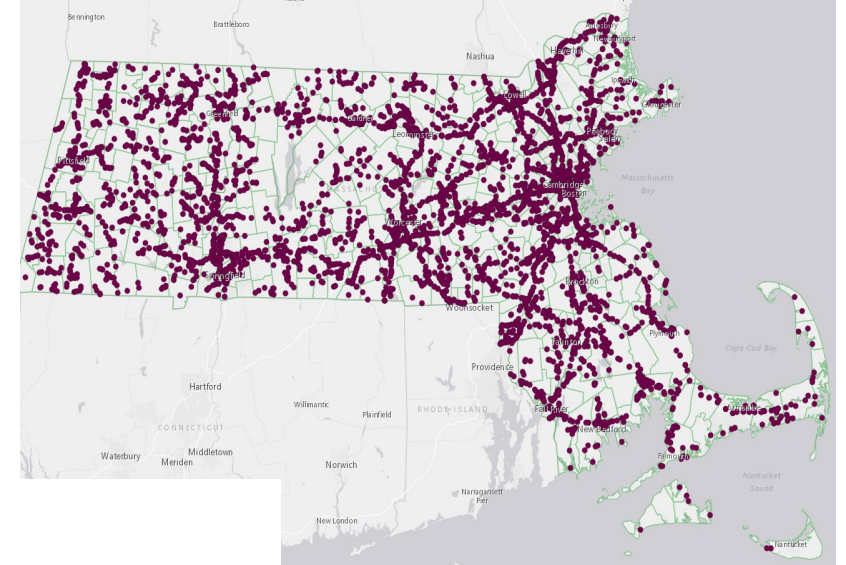
Small Bridges (1,553) – Massachusetts Bridge (BRI)

Span between 10 & 20'

Culverts (1,077)

Span between 4 & 10'

Total culvert inventory more than 5.5k (includes spans < 4')



## Context

MassDOT performs inspection of all DOT & Municipally-owned NBI and small bridges

An additional 73 NBI bridges are owned/operated by other state agencies (MBTA, Massport, DCR), and a small number owned by Federal Agencies (most notable U.S. Army Corp of Engineers Canal bridges)

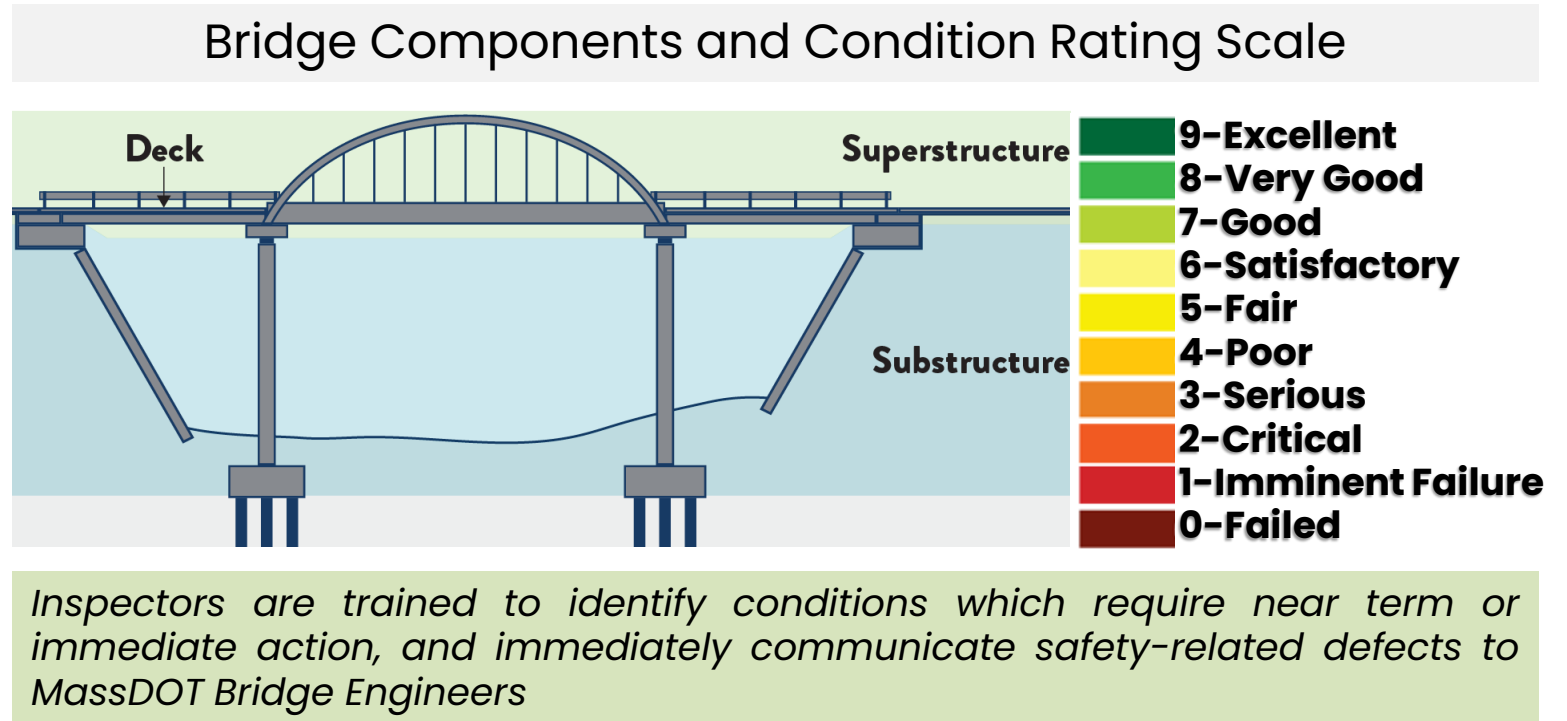
*Locations of  
Massachusetts NBI  
Structures*

**This Presentation is focused on DOT & Municipally-owned NBI Bridges**

# Bridge Condition

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- MassDOT performs hands-on inspection of DOT & MUN bridge biennially, or more frequent as conditions dictate
- All bridge elements are evaluated, and the major elements of *deck*, *superstructure* and *substructure* are rated on a 0-9 scale, 9 is excellent condition
- Lowest performing of the three elements governs the rating of the bridge (good, fair or poor)



# Current State Conditions

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- MA bridge inventory is the oldest in the nation, fourth worst nationally for NHS bridge condition
- Currently exceed Federal NHS minimum condition threshold (<10% poor), subject to penalty requiring **minimum obligation of federal funds each year**
- NHS conditions have improved from 17.5% poor to present day 11.6%, driven by funding from the Accelerated Bridge Program (ABP)

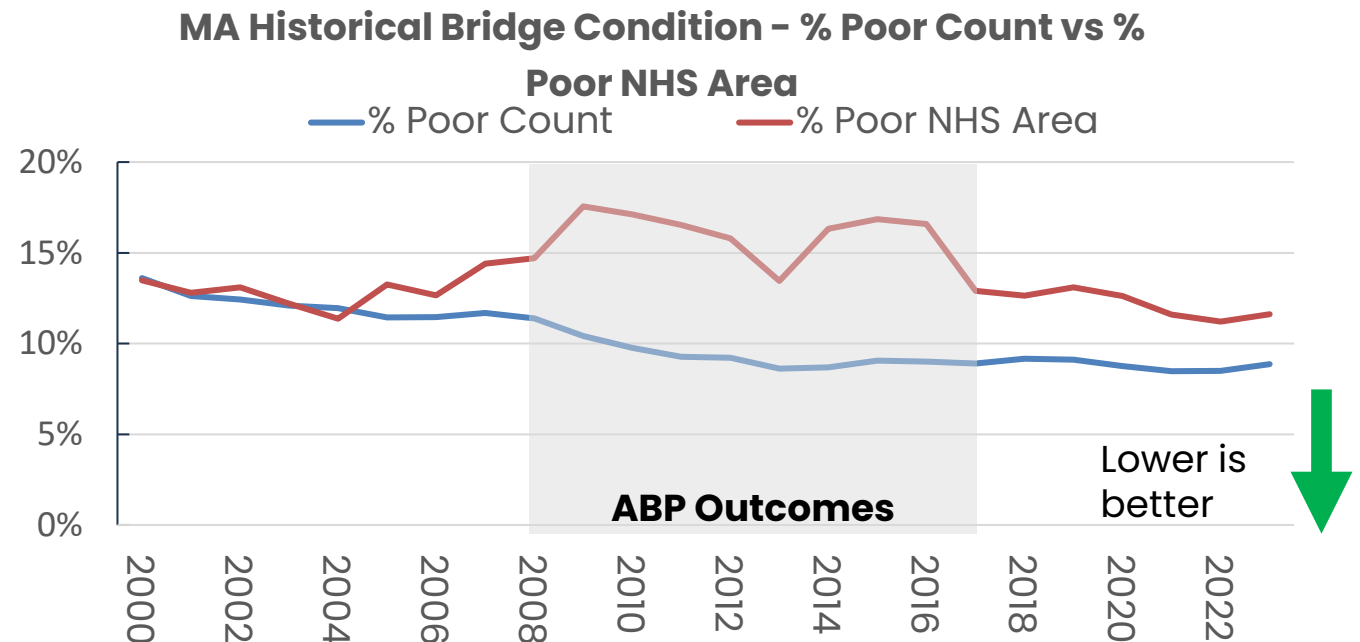
## Two primary bridge KPI

### Count of Poor Bridges (State Measure)

- All bridges counted equally

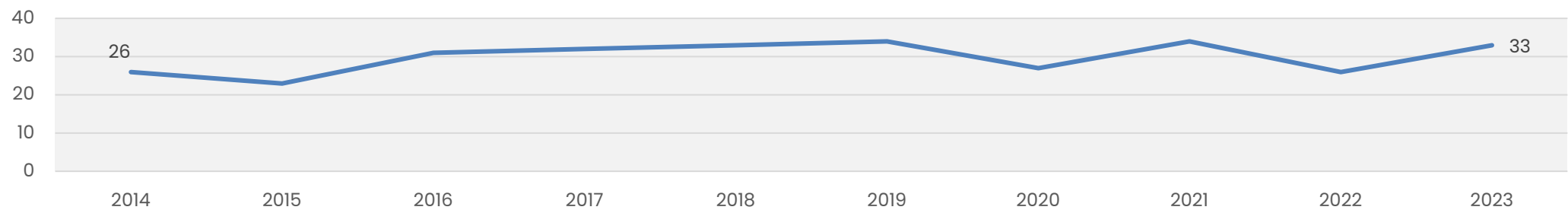
### Area of Poor Bridges (Federal Measure)

- NHS only – bridge condition in proportion to size



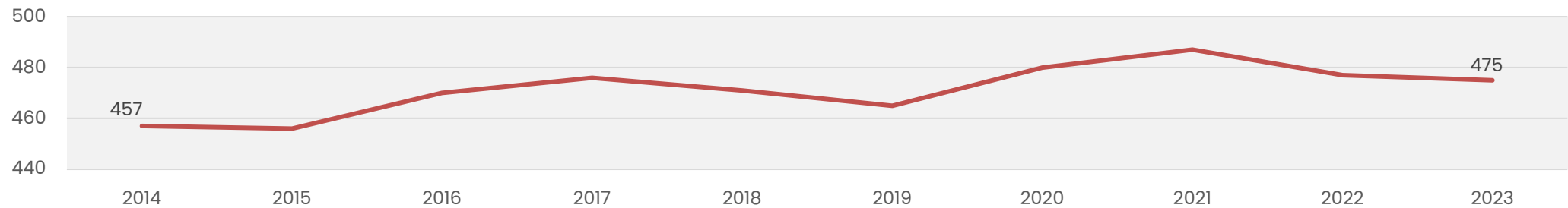
# Context to Current State

MA Bridges - Closed to Traffic (2014-2023)



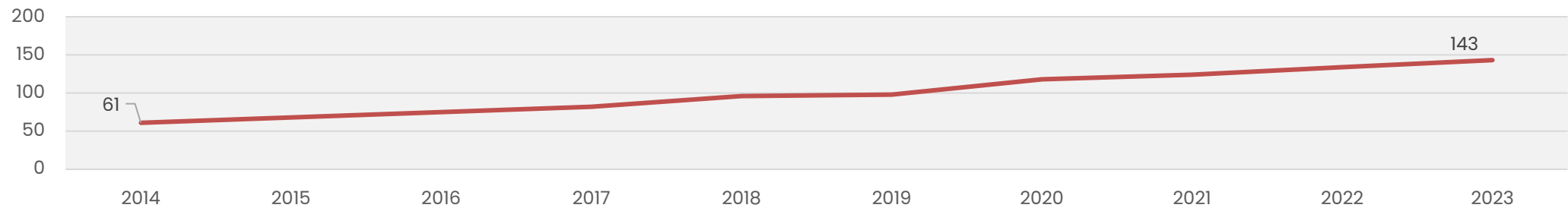
27% increase  
in closures  
over last 10  
Years

MA Bridges - Posted for Load (2014-2023)



4% increase  
in postings  
over last 10  
Years

MA Bridges - Shoring In Lieu of Posting (2014-2023)



134% increase  
in shored  
bridges over  
last 10 Years

# Bridge Prioritization

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$$[Ranking] = 0.3CL + 0.4(\Delta HI + SCF) + 0.3HEF$$

A	Condition Loss (CL)	Compares most recent inspection findings to excellent condition state	$100 \times ((9 - (\text{average of Items 58, 59, 60 \& 62})) / 9)$
B	Forecasted Change in Health ( $\Delta HI$ )	Expected condition in a "do nothing" 15-year scenario	$100 \times \text{Percent of HI change over simulation period} (\text{StartHI} - \text{EndHI}) / \text{StartHI}$
C	Resiliency – Scour Critical Factor (SCF)	susceptibility to channel scour (applicable to water crossings only)	Bridges are assigned a risk category of A,B,C or D, with factors 1.2, 1.15, 1.1, 1.05 respectively.
d	Highway Evaluation Factor (HEF)	Composite measure of Traffic volume, detour length, roadway class, load carrying restrictions	$100 \times (\text{Average of ( ADT Factor + Detour Length factor + Classification (Item 26) factor + Struct Evaluation (Item 67) Factor + Deck Evaluation (Item 68) factor) } / 5$

- NBI Bridges are prioritized annually using an algorithm weighting four factors
- Ranking provides quantitative basis to identify new projects for programming
- All bridges assigned statewide and regional priority ranking
- District Bridge engineers consulted in final selection to account for local priorities and maintenance needs

# Prioritization Example

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## Sample of Inventory Prioritization

Town	BDEPT	BIN	Condition Loss	HI Change	Scour Critical Code	HWY Eval Factor	Rank Factor
Gloucester	G05002	30L	55.56	35.16	1	84	55.93
Beverly	B11005	307	59.26	35.94	1	76	54.95
Westford	W26014	26G	77.78	19.10	1	76	53.77
Attleboro	A16062	3UL	55.56	14.44	1	96	51.24
Dennis	D07004	47T	66.67	12.91	1	84	50.36
Beverly	B11001	306	55.56	24.22	1	80	50.35
Weston	W29058	4QG	44.44	23.23	1	92	50.23
Boston	B16017	4WY	48.15	15.35	1	96	49.39
Boston	B16017	4WU	40.74	25.93	1	88	48.99



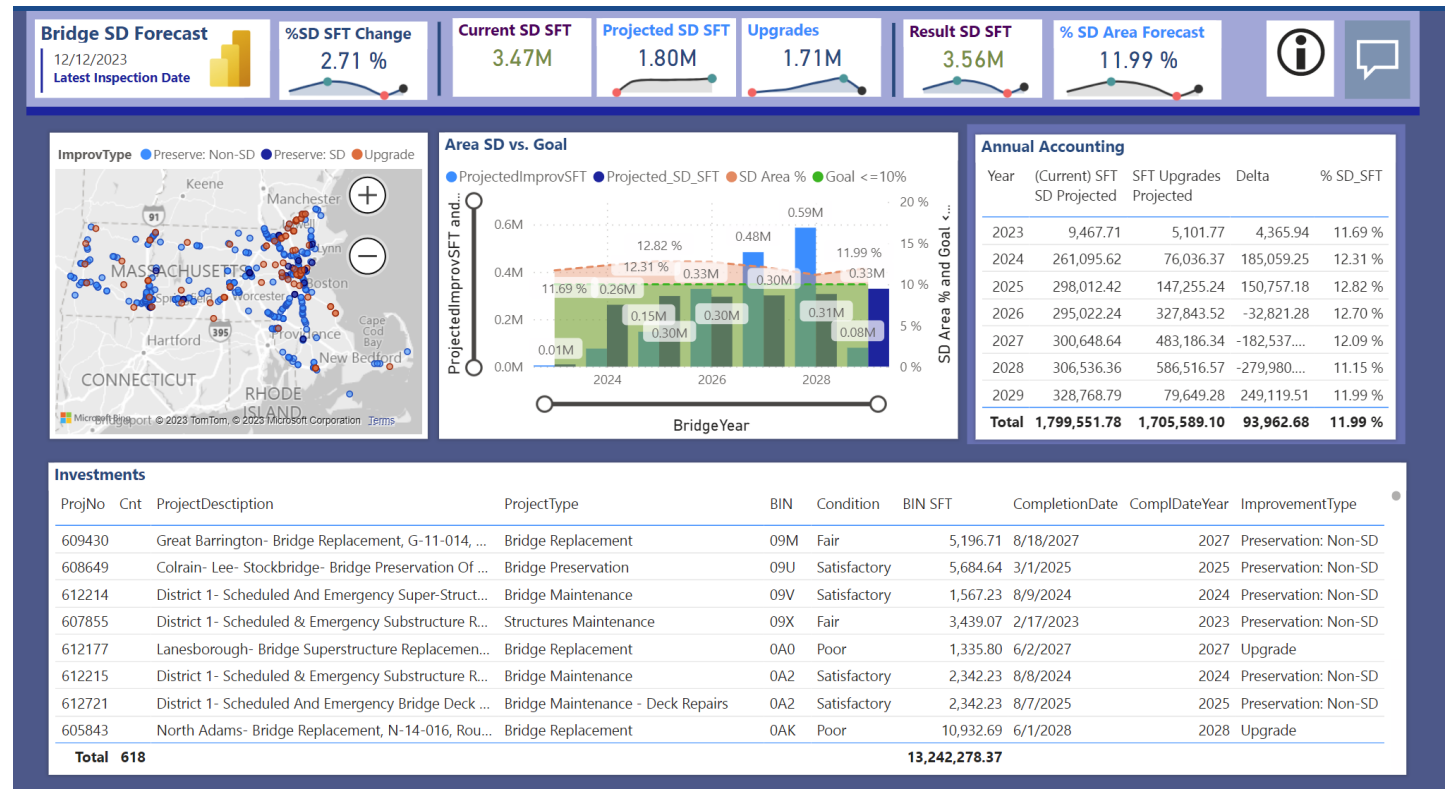
# Bridge Investment

- Bipartisan Infrastructure Law (BIL) Bridge Formula Program and the Massachusetts Next Generation Bridge Financing Program (NGB) introduced approximately \$2.8 B of additional bridge funding (contrast to \$3B ABP Program 15 years ago)
- Majority of these funds committed in 24 – 28 CIP through a two-part strategy
  1. Address backlog of poor bridges through rehabilitation and replacement projects
  2. Increase preservation program to slow growth of backlog
- MassDOT is keeping pace with Bridge Formula funds, with two annual allocations ('25 & '26) remaining under the BIL authorization
- NGB projects will begin advertisement this spring and are planned to extend through '28.
- MassDOT received one-time \$50M allocation of Fair Share Funds this year
- Additional investment in bridge preservation may be needed to keep pace with needed replacement and rehabilitation

# Program Management

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- The decisions and implementation of the capital program directly influence state bridge condition
- MassDOT employs business intelligence tools to integrate data from bridge, project and contract management systems and better forecast plan outcomes



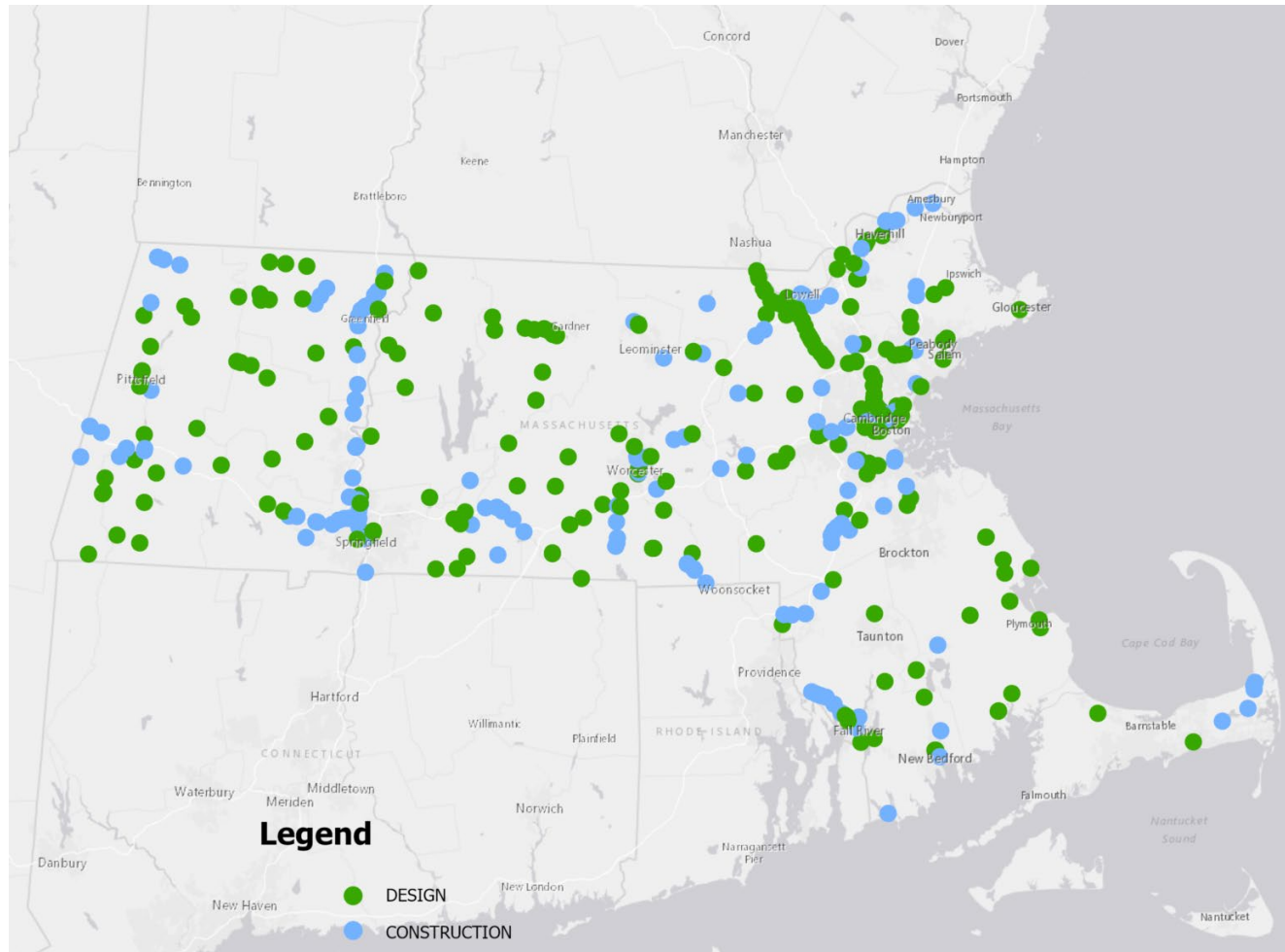
# Thank You



# Appendix

# Bridge Program Portfolio

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- 329 Active bridge projects proposed through the current 24-28 CIP
- Repair, rehabilitation or replacement of nearly 600 bridges
- Improving state of repair good in 183 Communities