

To: Transportation Committee
Transportation Subcommittee

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Date: June 6, 2018; REVISED June 15, 2018

Subject: Performance Measures and Target Setting – Bridge Conditions

REVISED

Revisions to:

- Text in RED
- Figure 3

Per Federal requirements, on May 20, 2018 CTDOT set 2-year and 4-year Transportation Performance Measures targets for ten (10) FHWA performance measures covering 5 general areas, summarized below. CRCOG now has until November 16, 2018 to either adopt/support each CTDOT target, or set our own.

- Bridge Conditions
- Pavement Conditions
- Performance of the National Highway System (NHS)
- Performance of Freight
- CMAQ Program – On-Road Mobile Source Emissions

This memorandum presents and reviews the current Bridge Conditions and CTDOT Performance Measure Targets, and offers potential CRCOG Target recommendations for review and discussion at the upcoming June Subcommittee meeting.

FHWA Bridge Conditions Performance Measure

The two FHWA Bridge Condition performance measures include:

- Percentage of NHS Bridges classified as in Good condition (by deck area)
- Percentage of NHS Bridges classified as in Poor condition (by deck area)

To understand these measures, it is important to have the following background:

- Federal guidance focuses the bridge performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.
- Per federal guidelines, structures with lengths exceeding 20 feet (sum of its spans) are considered bridges. CTDOT regularly inspects all Connecticut bridges (regardless of ownership), and assigns each a condition rating (Good, Fair, Poor) also per federal guidelines.
- CTDOT uses dTIMs, developed by Deighton Associates, as their asset management system. The program encompasses strategic planning components with maintenance, operations and capital investment decision-making aspects.
- CTDOT's Bridge Management System starts with the current status of the bridge, accounts for programmed work and adjusts for predicted decay. Major bridges are analyzed individually by engineers and spreadsheets and all other structures are analyzed by dTIMS. Bridge inputs to dTIMS include current bridge condition data, deterioration curves, scheduled projects, treatments and costs, budgets, time spans, inflation and discount rates.

Current NHS Bridge Conditions

The below graphics represent NHS bridge conditions within our region, compared to other regions.

MPO	NHS-NBI Bridges (Deck Area - ft ²)	Locally Owned NHS-NBI Bridges	FAST Act National Performance Management Measures	
			% Good (by deck area)	% Poor or % Structurally Deficient (by deck area)
1 - South Western	2,183,450	0	3.3%	19.1%
2 - Housatonic Valley	920,157	2	22.0%	7.4%
3 - Northwest Hills (RPO)	273,510	0	22.7%	10.0%
5 - Central Naugatuck Valley	1,917,348	1	9.7%	34.2%
7 - Greater Bridgeport Valley	3,765,462	0	24.8%	6.3%
8 - South Central Region	4,014,609	4	42.8%	6.0%
10 - Capitol Region	8,567,699	5	13.6%	15.7%
11 - Lower CT River Valley	1,418,300	2	11.0%	16.2%
13 - Southeastern CT	2,832,830	0	7.4%	23.0%
15 - Northeastern CT (RPO)	377,273	0	15.3%	12.6%
TOTAL	26,270,638	14	18.1%	14.9%

Currently, 15.0% of NHS Bridges statewide (by deck area) are categorized in Poor condition, with bridges within CROCOG experiencing a similar percentage of 15.7%. A map showing the region's NHS Bridges currently in Poor condition appears in Figure 2.

Bridge Condition Measures

- % of NHS Bridges in “Good” and “Poor” condition
- Max % poor: 10 (MAP-21)

Asset (unit of measure)	Current Condition (NBI submittal 3/2017)		2-year targets (2020)		4-year targets (2022)	
	Good %	Poor %	Good %	Poor %	Good %	Poor %
NHS Bridge (deck area)	18.1	15.0	22.1	7.9	26.9	5.7
			Better	Better	Better	Better

CTDOT’s statewide bridge performance targets are summarized above.

Staff Review of CTDOT NHS Bridge Condition Targets

Federal regulations require that State DOT’s maintain bridges so the percentage of bridge deck area classified as poor does not exceed 10%. If, for 3 consecutive years, this condition is not met, States are required to obligate and set aside National Highway Performance Program (NHPP) funds for eligible bridge projects on the NHS.

To determine the future 2-year and 4-year statewide targets, CTDOT relied on projections from its bridge asset management program, and utilized an assumption that, 2017 funding levels would be maintained. Under this scenario, CTDOT sees the condition of NHS Bridges improving, with both the percentage of bridges in Good condition increasing, and the percentage of bridges in Poor condition decreasing. The anticipated percent of NHS Bridges in Poor condition, is anticipated to decrease to 7.9% and 5.7% in 2 and 4 years, respectively.

Non-NHS Bridge Conditions

As previously noted, the FHWA bridge performance measures only apply to bridges located on the NHS. However, there are almost as many bridges within the region that are not located on the NHS (516 vs. 528). Currently, **39** of the region's Non-NHS bridges (representing **7.6%** of Non-NHS bridge deck area) are in Poor condition. All regional non-NHS bridges are mapped in Figure 3.

An item worth noting, we understand there are 5 locally owned bridges on the NHS. These bridges are generally summarized below:

Condition	Town	Facility Carried	Features Intersected
Poor	West Hartford	North Main St.	West Branch Trout Brook
Good	West Hartford	Farmington Ave.	Trout Brook
Fair	Hartford	I-84 AMTRAK CTFA	North Branch of Park River
Fair	Hartford	I-84 RAMPS and Locals Streets	Park River Conduit
Fair	Hartford	SR 598 + Local Streets	Park River Conduit

As we consider bridge conditions and investments, we may want to consider prioritizing improvements to these 5 bridges, when conditions merit, given they are locally owned and appear to be regionally significant. CRCOG will further discuss these structures with the towns of West Hartford and Hartford.

Current TIP Bridge Funding

CRCOG reviewed the Transportation Improvement Program (TIP) and the TIP Bridge Report (April 2018) to assess financials associated with bridge improvements within the Capital Region. In general, we found that approximately \$793 million is programmed in the TIP for bridge projects (including inspection, design, repair and construction) between FFY2018 and 2021.

Staff Recommendations

The CTDOT 2020 and 2022 targets work to address the Poor condition of bridges on the NHS and meet federal guidelines. CRCOG feels developing our own regional targets for NHS roads is outside of what we can reasonably do given limited access to DOT's asset management system and regional data. CRCOG recommends supporting DOT's 2 and 4-year targets for the NHS bridge conditions.

However, CRCOG staff feels that we should also aim to improve the non-NHS bridges in our region, with the goal of **not exceeding a maximum of 10% in poor condition in 2020 and 2022.** We suggest that this goal would be an administrative one and something to monitor and work with CTDOT and municipalities on to ensure projects not on the NHS are being addressed. Many of these non-NHS bridges are municipally owned and therefore of prime importance to us.

CRCOG staff also recommends that we work on the following initiatives:

- Monitor the 5 locally owned bridges on the NHS (identified above) and ensure improvements are prioritized for structures in 'Poor' conditions
- Coordinate with CTDOT to understand the dTIMS asset management system and assess regional use
- Incorporate the Non-NHS Bridges in poor condition data and map into CRCOG's Long Range Transportation Plan
- Update bridge condition mapping on a year basis to monitor progress and bridge conditions
- Coordinate with CTDOT as it relates to bridge investments within our region
- Ensure improvements to Interstate 84 in Hartford advance, especially reconstruction of the Interstate 84 Viaduct project
- Monitor bridge performance best practices in other states and Regional Planning Organizations

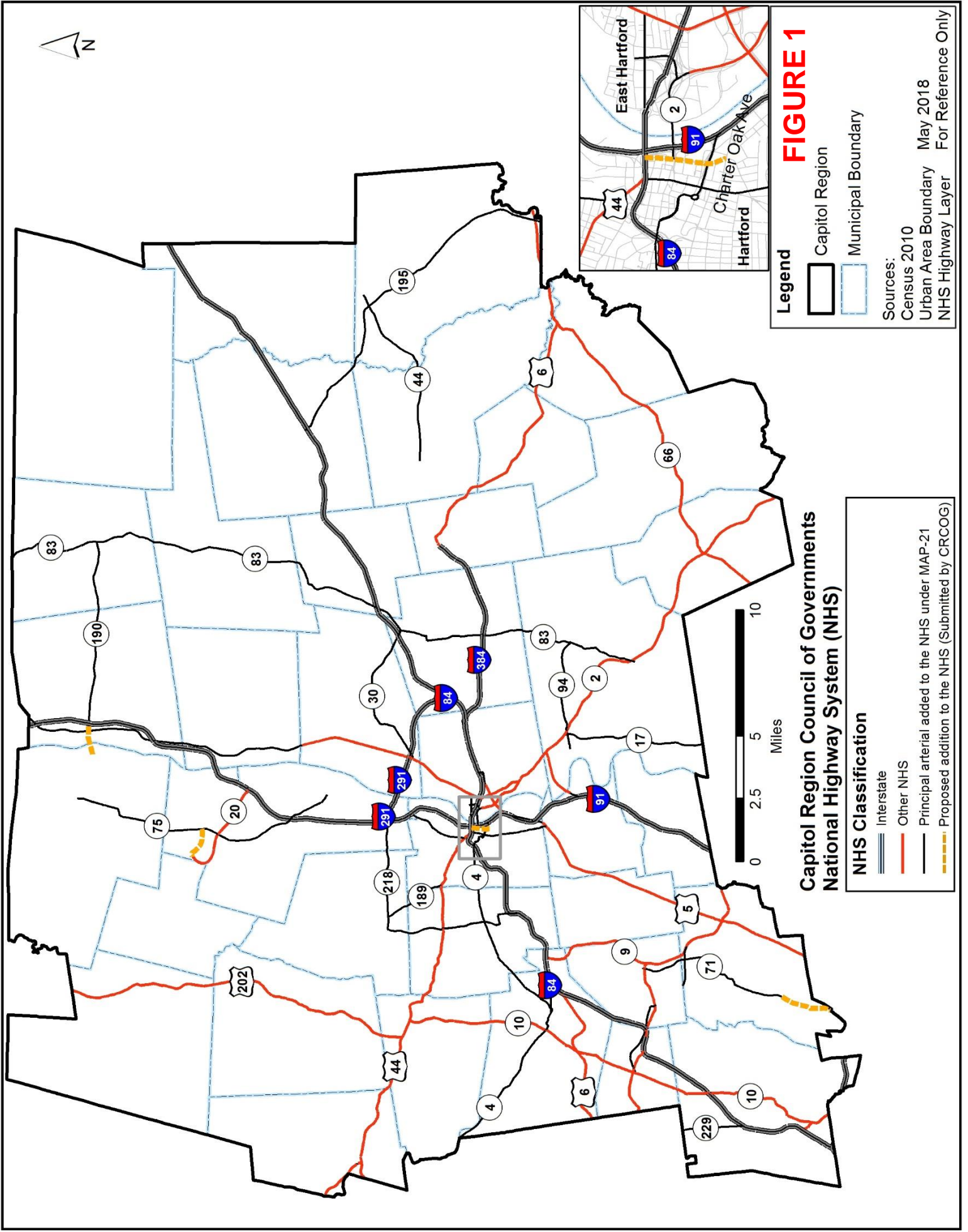


FIGURE 1

Legend





-  Capitol Region
-  Municipal Boundary

Sources:
 Census 2010
 Urban Area Boundary
 NHS Highway Layer

May 2018
 For Reference Only

**Capitol Region Council of Governments
 National Highway System (NHS)**

NHS Classification

-  Interstate
-  Other NHS
-  Principal arterial added to the NHS under MAP-21
-  Proposed addition to the NHS (Submitted by CRCOG)

0 2.5 5 10
 Miles



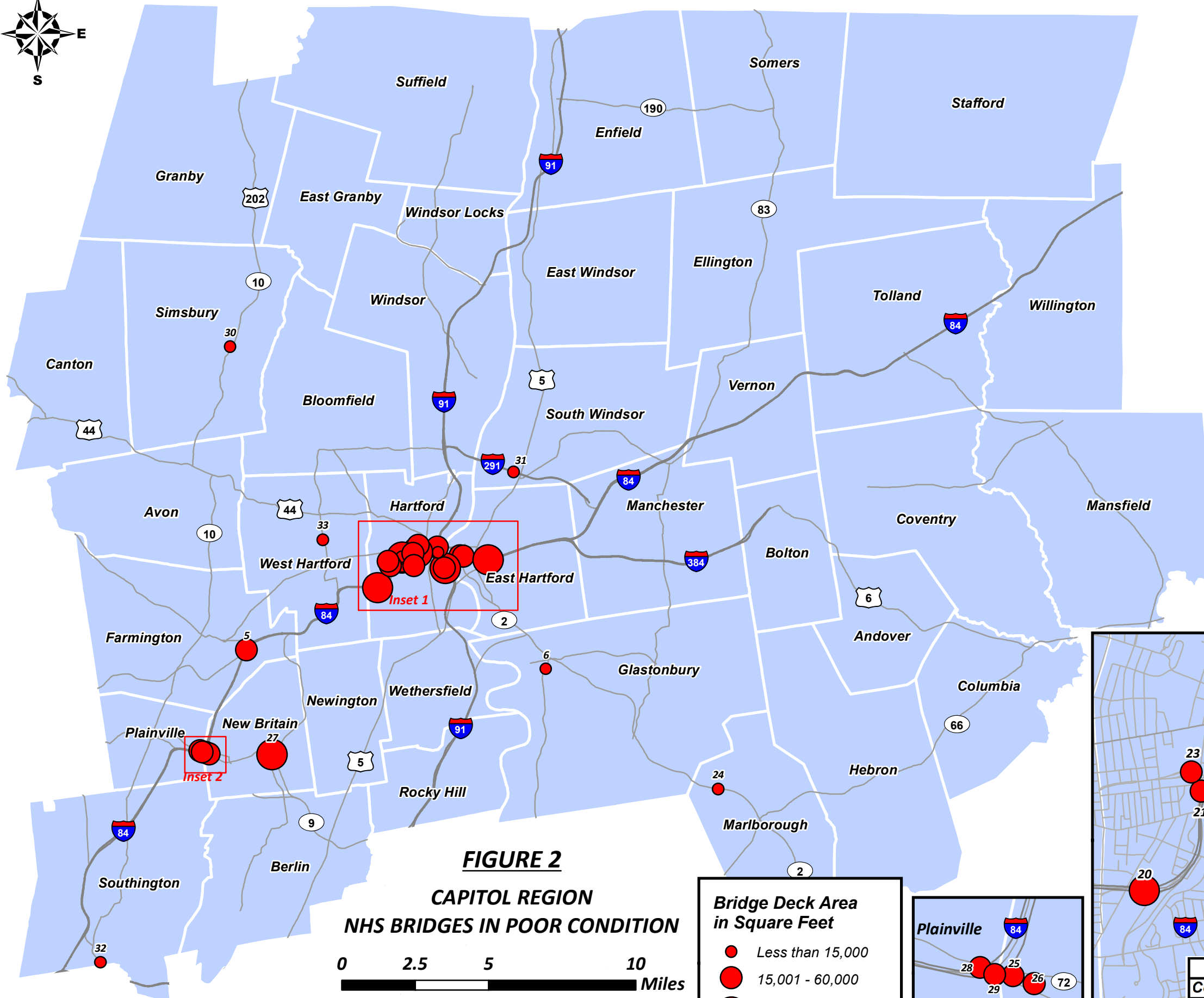
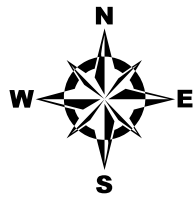
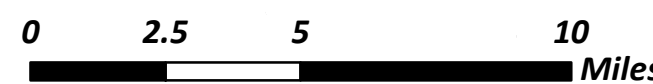
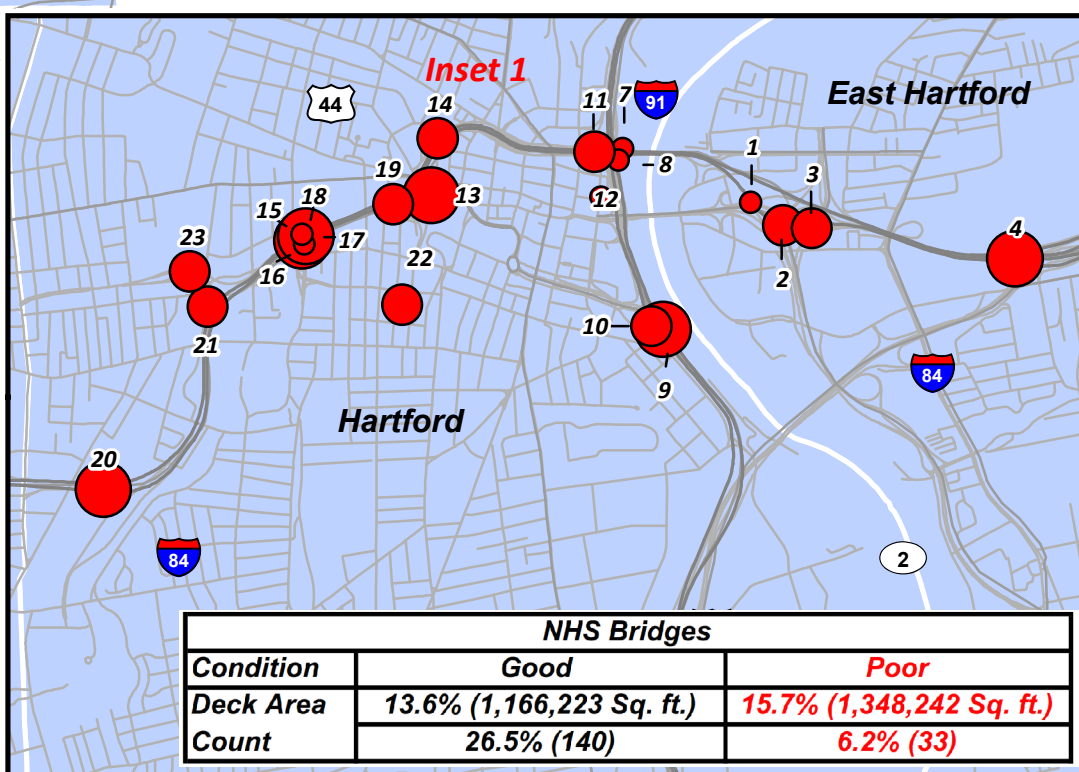
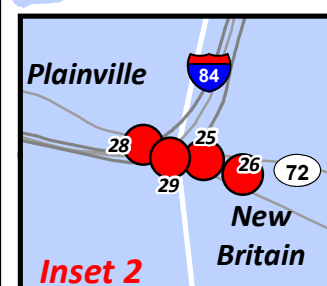


FIGURE 2
CAPITOL REGION
NHS BRIDGES IN POOR CONDITION



Bridge Deck Area in Square Feet

- Less than 15,000
- 15,001 - 60,000
- Greater than 60,000



	Municipality	Feature Carried	Area (sq ft)	Length (ft)
1	East Hartford	I-84 TR 829	9,386	143
2	East Hartford	ROUTE 2 WESTBOUND	20,315	645
3	East Hartford	SR 500 TR 801	18,694	419
4	East Hartford	INTERSTATE-84 EB	88,933	1390.1
5	Farmington	INTERSTATE-84 EB	33,796	485.9
6	Glastonbury	ROUTE 17 NB	3,336	73.2
7	Hartford	I-84 TR 826	6,992	263.1
8	Hartford	I-91 TR 840	11,783	408.1
9	Hartford	INTERSTATE-91 NB	64,226	1350.1
10	Hartford	SR 598 EASTBOUND	17,215	361.9
11	Hartford	INTERSTATE-84	58,805	870.1
12	Hartford	I-84 TR 825	13,408	524
13	Hartford	INTERSTATE-84 EB	89,654	1271
14	Hartford	INTERSTATE-84 WB	59,796	810
15	Hartford	INTERSTATE-84 EB	161,105	3252
16	Hartford	INTERSTATE-84 WB	188,670	3177.2
17	Hartford	I-84 RAMP 114	10,621	415
18	Hartford	I-84 RAMP 115	10,881	307.1
19	Hartford	INTERSTATE-84 EB	46,339	974.1
20	Hartford	INTERSTATE-84 EAST	102,688	1852
21	Hartford	I-84 TR 824	42,059	1187
22	Hartford	I-84 TR 823	51,612	1430.1
23	Hartford	I-84 TR 823	16,510	599.1
24	Marlborough	ROUTE 2 WESTBOUND	5,154	118.1
25	New Britain	I-84 TR 815	29,233	928.1
26	New Britain	I-84 RAMPS 181&184	25,542	430.1
27	New Britain	ROUTE 71	67,272	630.9
28	Plainville	INTERSTATE-84 WB	36,764	663.1
29	Plainville	INTERSTATE-84 EB	47,297	853
30	Simsbury	ROUTE 10	2,164	44
31	South Windsor	I-291 & KING ST.	2,925	36.1
32	Southington	ROUTE 10	2,015	59.1
33	West Hartford	NORTH MAIN STREET	3,053	50.9

NHS Bridges		
Condition	Good	Poor
Deck Area	13.6% (1,166,223 Sq. ft.)	15.7% (1,348,242 Sq. ft.)
Count	26.5% (140)	6.2% (33)

Date: June 2018
 Datasource: 2017 National Bridge Inventory
 For Reference Purposes Only

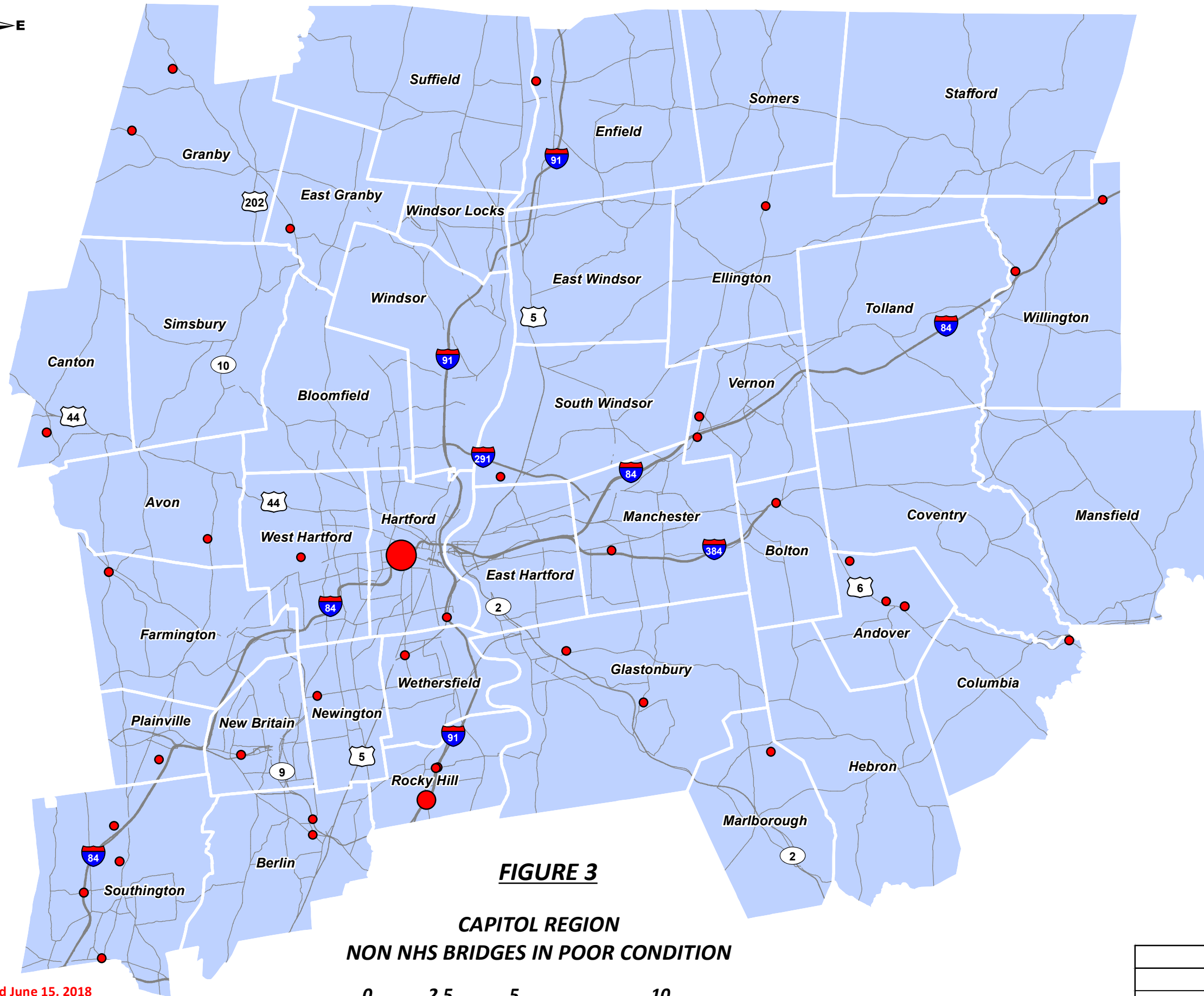
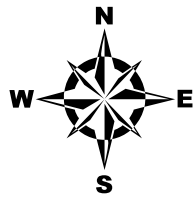


FIGURE 3
CAPITOL REGION
NON NHS BRIDGES IN POOR CONDITION



Municipality	Non NHS Bridges in Poor Condition
Andover	3
Avon	1
Berlin	2
Bloomfield	0
Bolton	1
Canton	1
Columbia	0
Coventry	1
East Granby	1
East Hartford	0
East Windsor	0
Ellington	1
Enfield	1
Farmington	1
Glastonbury	2
Granby	2
Hartford	2
Hebron	0
Manchester	1
Mansfield	0
Marlborough	1
New Britain	1
Newington	1
Plainville	1
Rocky Hill	3
Simsbury	0
Somers	0
South Windsor	1
Southington	4
Stafford	0
Suffield	0
Tolland	0
Vernon	2
West Hartford	1
Wethersfield	1
Willington	3
Windsor	0
Windsor Locks	0
CRCOG Total	39

Bridge Deck Area in Square Feet

- Less than 15,000
- 15,001- 60,000
- Greater than 60,000

	Non-NHS Bridges	
	Good	Poor
Deck Area	21.4% (630,359 Sq. ft.)	6.8% (198,925 Sq. ft.)
Count	37.2% (192)	7.6% (39)

Date: Revised June 15, 2018
 Datasource: 2017 National Bridge Inventory
 For Reference Purposes Only