2023 Michigan Bridge Week

MDOT Bureau of Bridges and Structures Update

BUREAU of BRIDGES
SPANNING CONNECTING
SAFELY EFFICIENTLY
and STRUCTURES

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Chief Bridge Engineer

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MICHIGAN DEPARTMENT OF TRANSPORTATION

WHO WE ARE, WHAT WE DO

OUR MISSION

SERVING AND CONNECTING PEOPLE, COMMUNITIES, AND THE ECONOMY THROUGH TRANSPORTATION.

WHAT WE STAND FOR

OUR VALUES

VISIONARY

Anticipate, imagine, and implement creative solutions.

ENSURING POSITIVE OUTCOMES

Collaborate, align, and deliver results.

PEOPLE FIRST

Value others, set clear expectations, and show appreciation and gratitude.

PROFESSIONAL EXCELLENCE

Know your role, act timely, and continuously learn and share.

DIVERSITY, EQUITY, AND INCLUSION

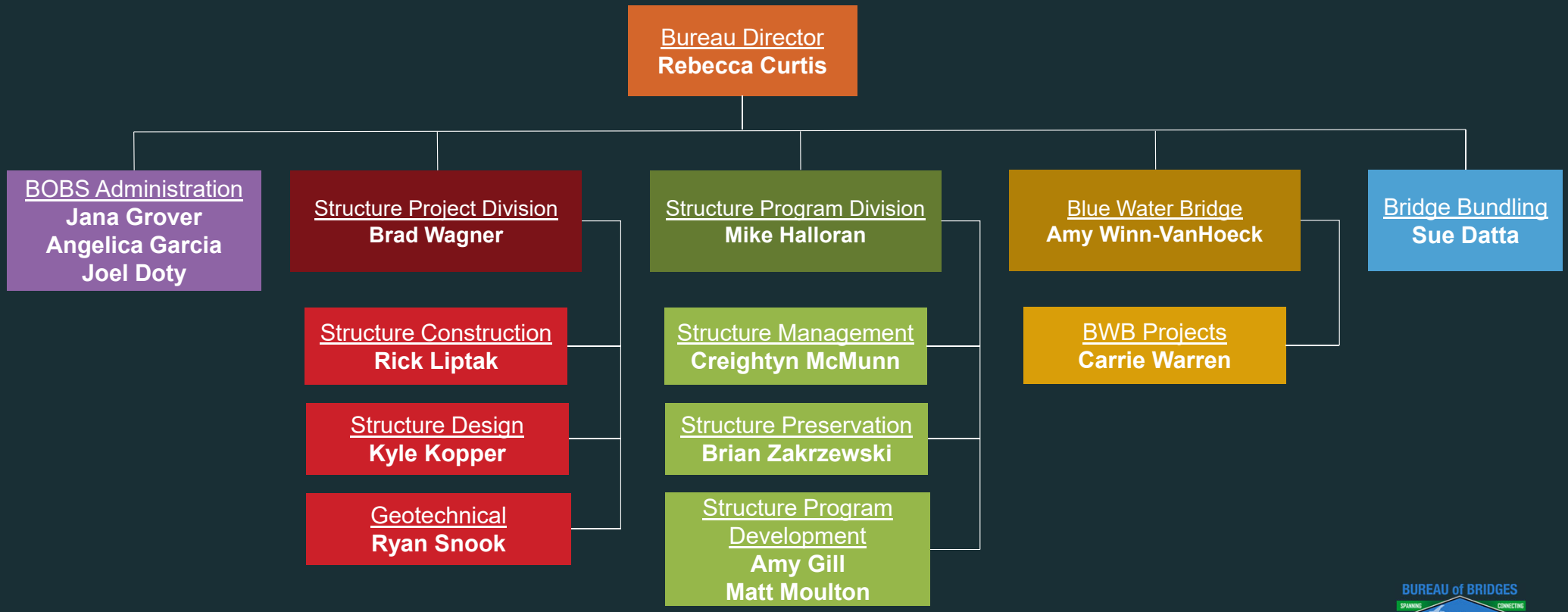
Value all people, seek to understand, and be open to all voices.

CHARACTER AND INTEGRITY

Be honest, fair, and trustworthy.

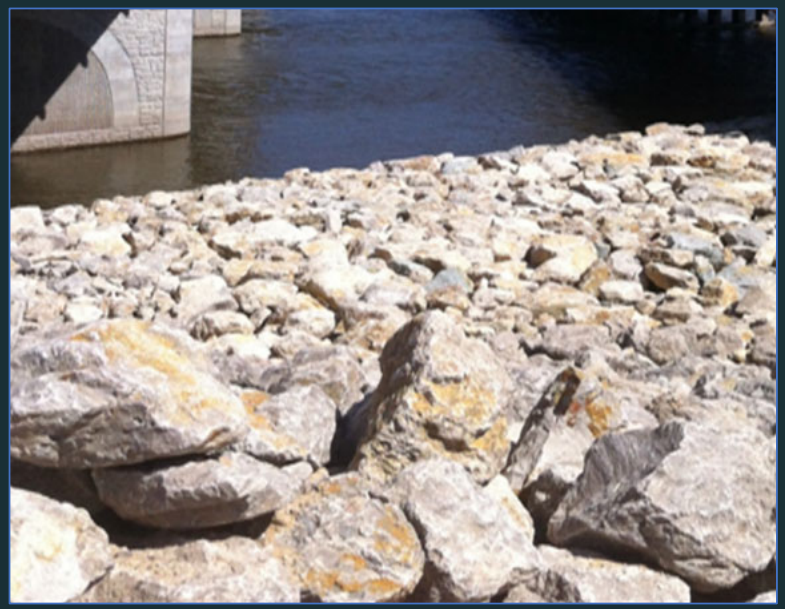
Michigan Department of Transportation

Bureau of Bridges and Structures Organization



BUREAU of BRIDGES and STRUCTURES

Riprap Challenges

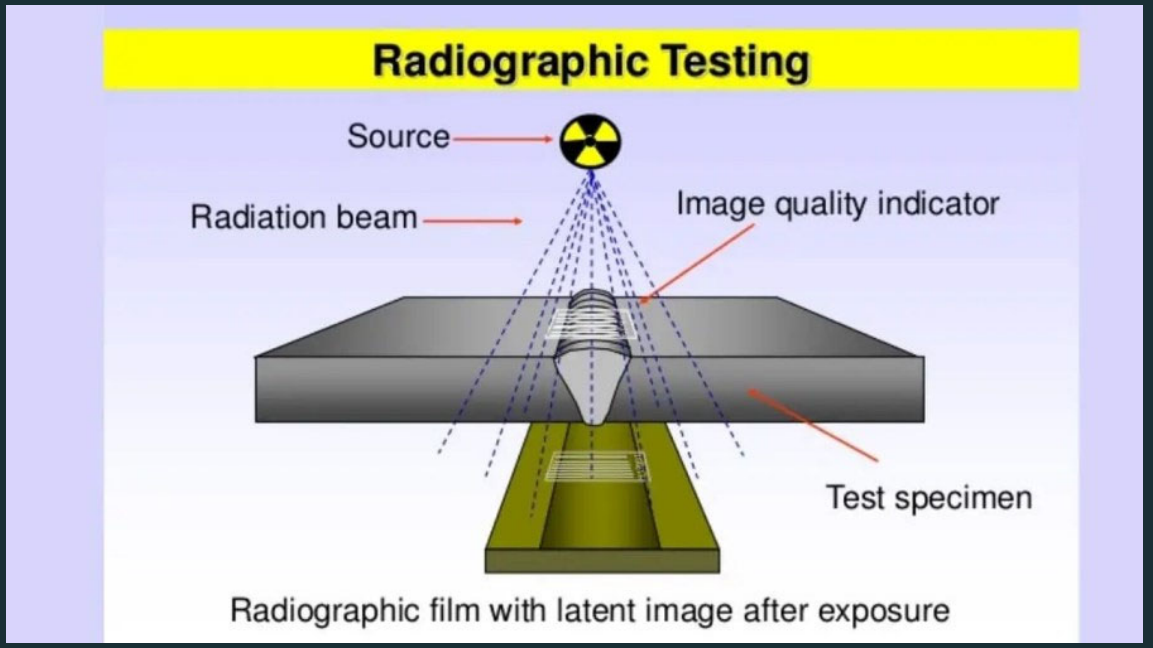


Checklist for riprap

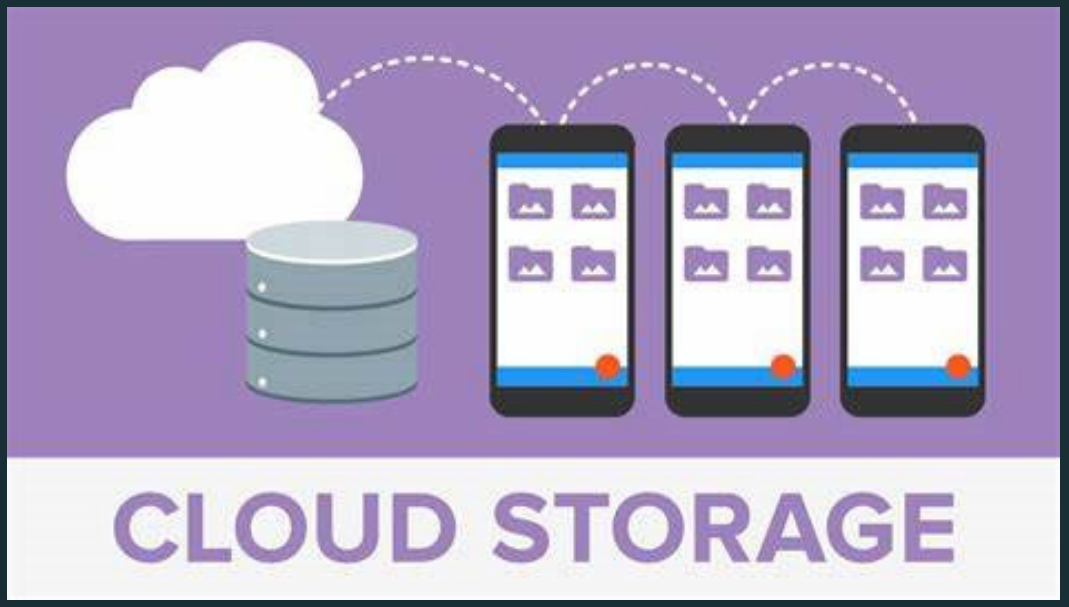
1. Is there a special provision in the proposal for RIPRAP, SPECIAL? If so, answer the questions a thru c
   a. Does the riprap have a 2.5 minimum bulk dry specific gravity _____
   b. Does riprap have a 2.5 percent maximum 24 hour soak absorption in accordance with ASTM D6473? _____
   c. The weight loss in 5 cycles by use of sulfate soundness testing must not exceed 10 percent in accordance with ASTM D 5240 _____
2. Has the riprap gradation been determined using the Wolman Count, according to Federal Lands Highway Standard Test Method T521-13? _____
3. Has riprap been checked at the pit to make sure the riprap is the correct size? _____
4. Has riprap been checked when received on the project to make sure riprap did not breakdown between the quarry and the project site? _____
5. Does the non-woven geotextile liner meet standard specifications requirements. Woven geotextile is not allowed to be used. _____
6. Is the non-woven geotextile liner being overlap at least 2 feet . _____
7. Is the non-woven geotextile liner shingle lapped with the water runoff? _____
8. Is the non-woven geotextile liner being wrapped around as shown on the plans _____
9. Is the riprap that is being placed free of any soil, crushed concrete, or other contamination? _____
10. Is the contractor filling the voids between the rocks placed with smaller rocks to ensure a uniform layer? _____
11. Is the depth of the riprap the correct depth throughout the placement as shown on the plans? _____
12. Are the side headers and toe headers built according to the plan details? _____
13. Riprap elevations (Part 31 of PA 451 compliance):
    a. Is the top of riprap set at or below the existing streambed/slope elevation? _____
    b. Is the riprap placement for filling in scour holes, as designated on plans (and compliant with the EGLE permit)? _____

Radiographic Testing

© High Steel.



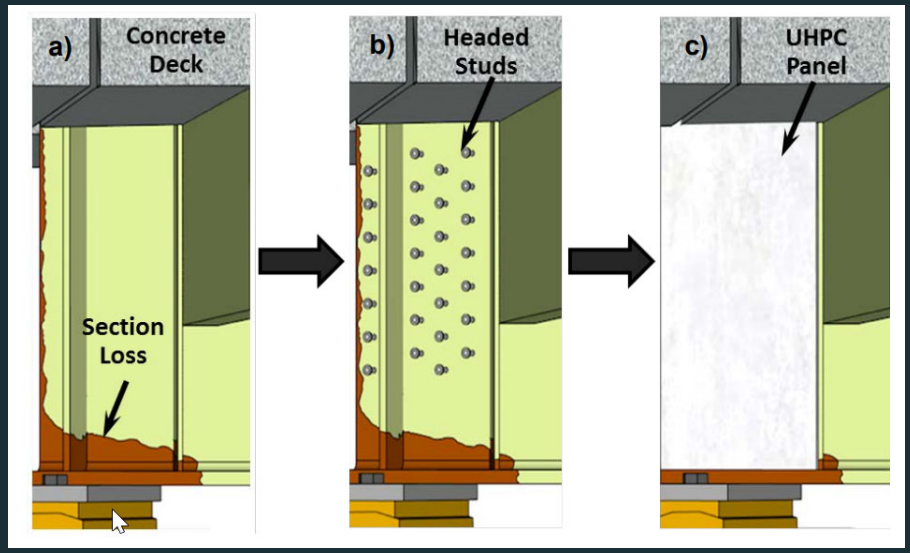
Radiographic Testing



Salvaging Shear Studs

- Goal is to reduce risk of damage to beam top flange
- Stud shear developers have remaining life when replacing the deck and are generally able to be salvaged
- After a pilot project, we are moving in the direction of salvaging studs as the standard

UHPC Beam End Repairs



Credit: Arash E. Zaghi and Alexandra Hain, University of Connecticut

Structure Construction & Structure Design

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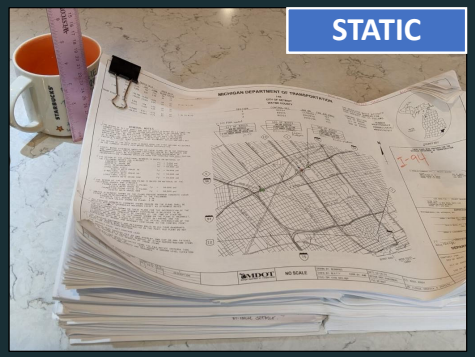
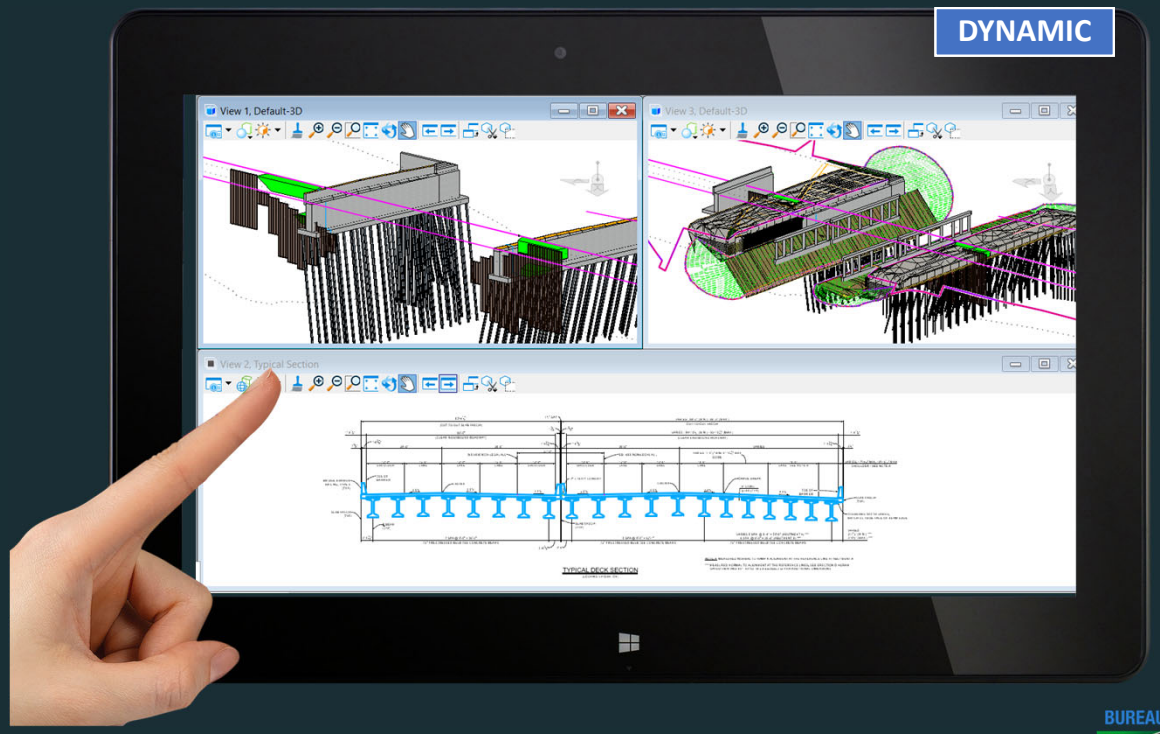
CFRP Prestressing

Third project using 0.7” strands will be let this year.

Bridge Model Delivery Pilot





- Design info in model
- Dynamic Views
- Saved Views
- Annotations
- Supplemental Documents

Structure Construction & Structure Design

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Geosynthetic Reinforced Soil

- 20% Cost Savings for recent projects
- Potential Sites:
  - Grade Separations
  - Some Water Crossings
  - Competent Foundation Soils
  - Traffic Can Be Detoured
  - Groundwater is not Shallow

Geotechnical

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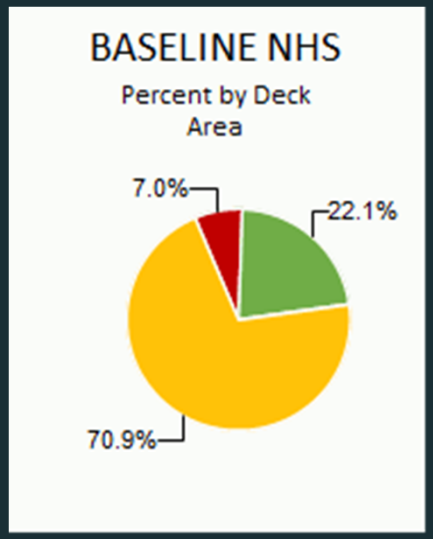
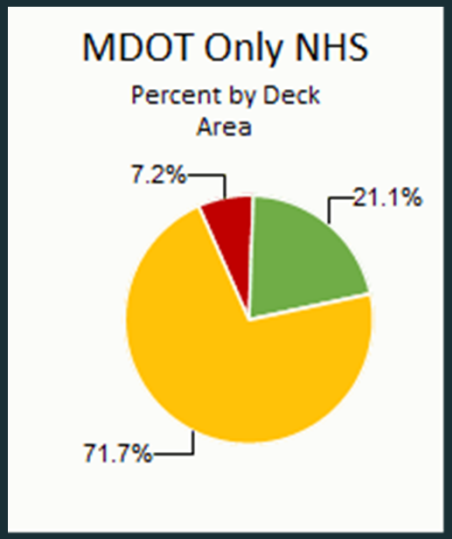
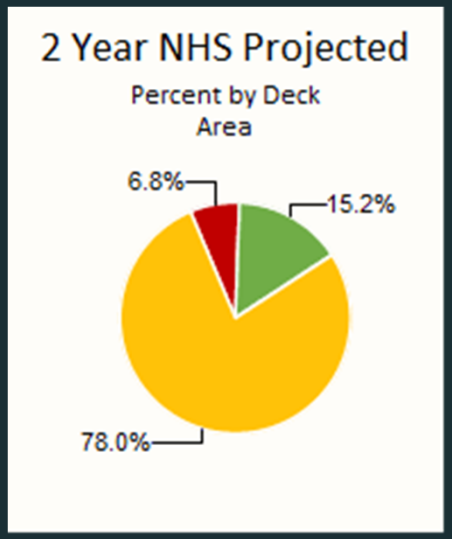
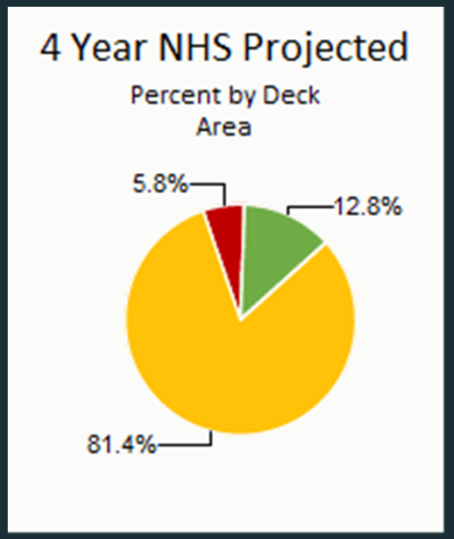
National Performance Measure Update

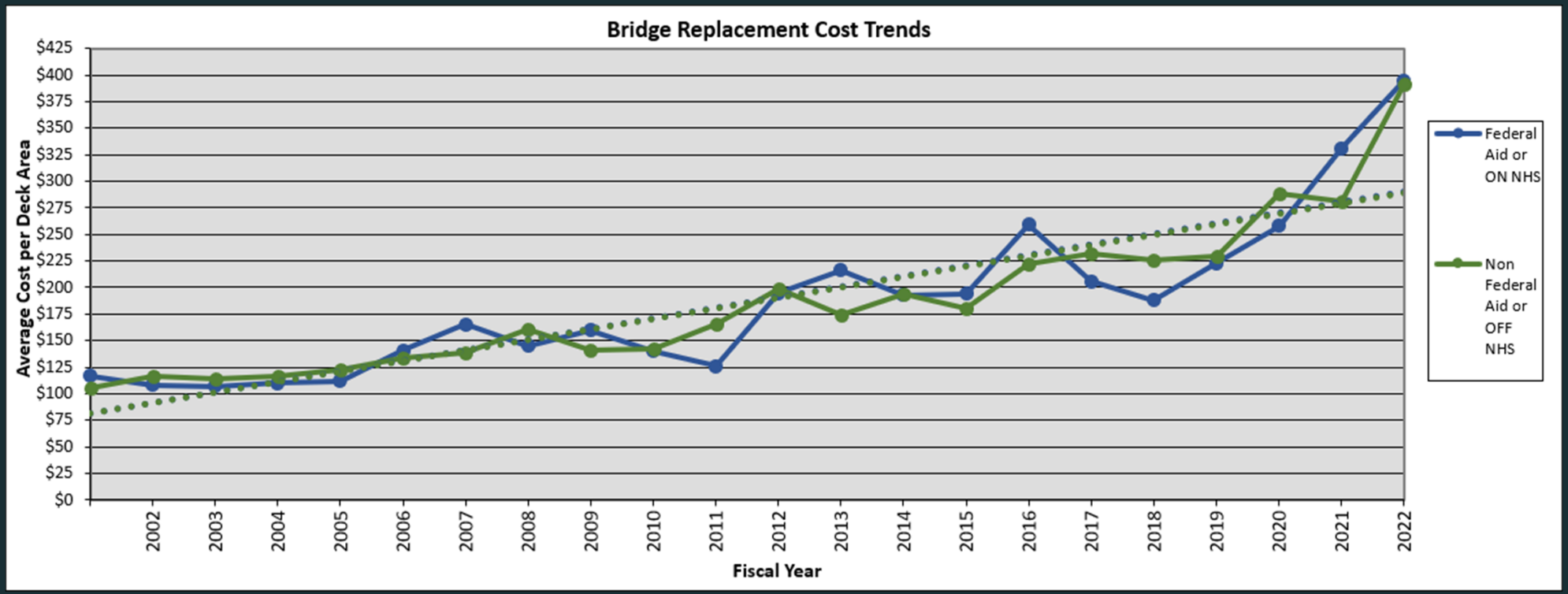








Federal Bridge Replacement Cost Data



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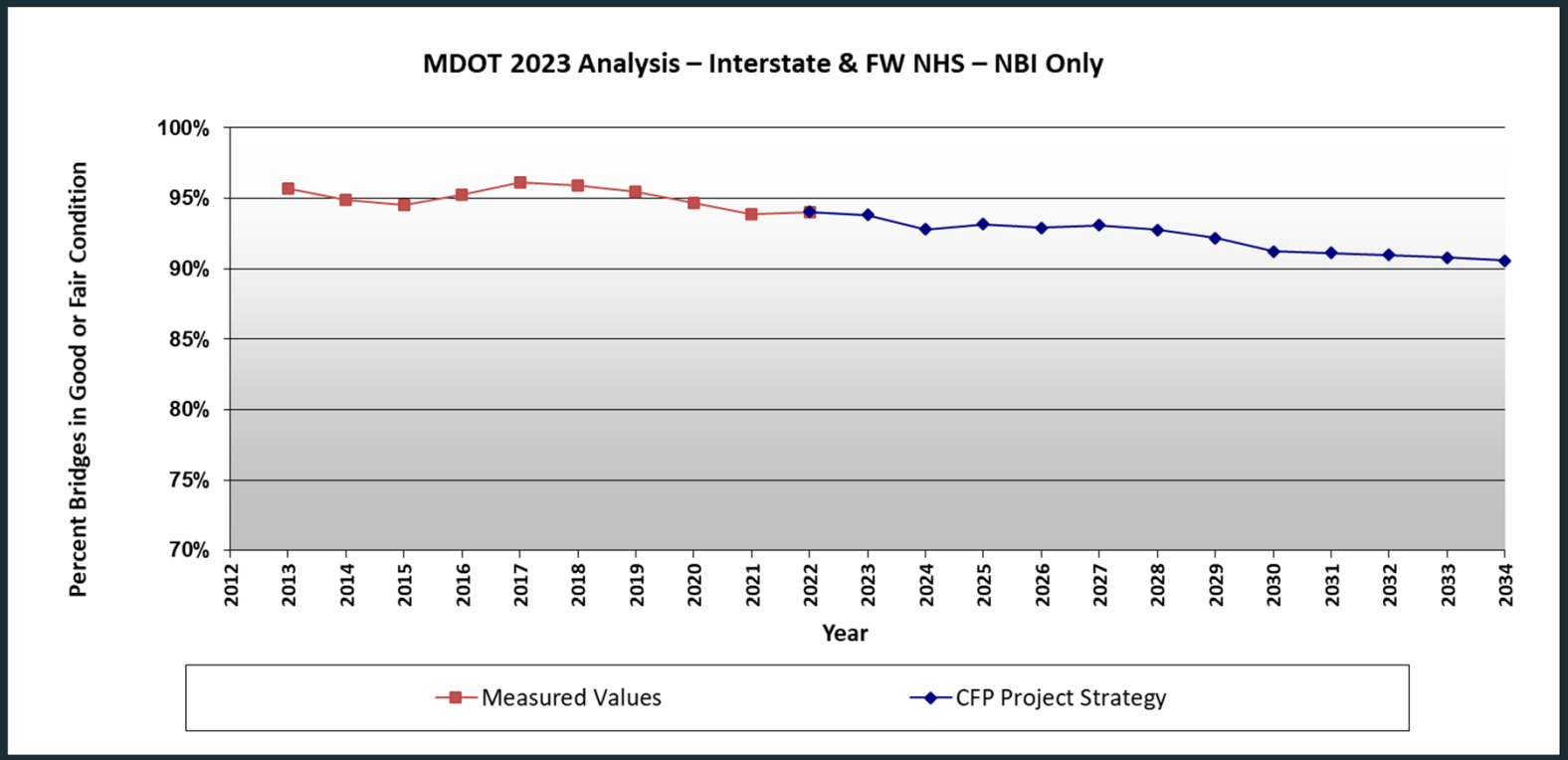
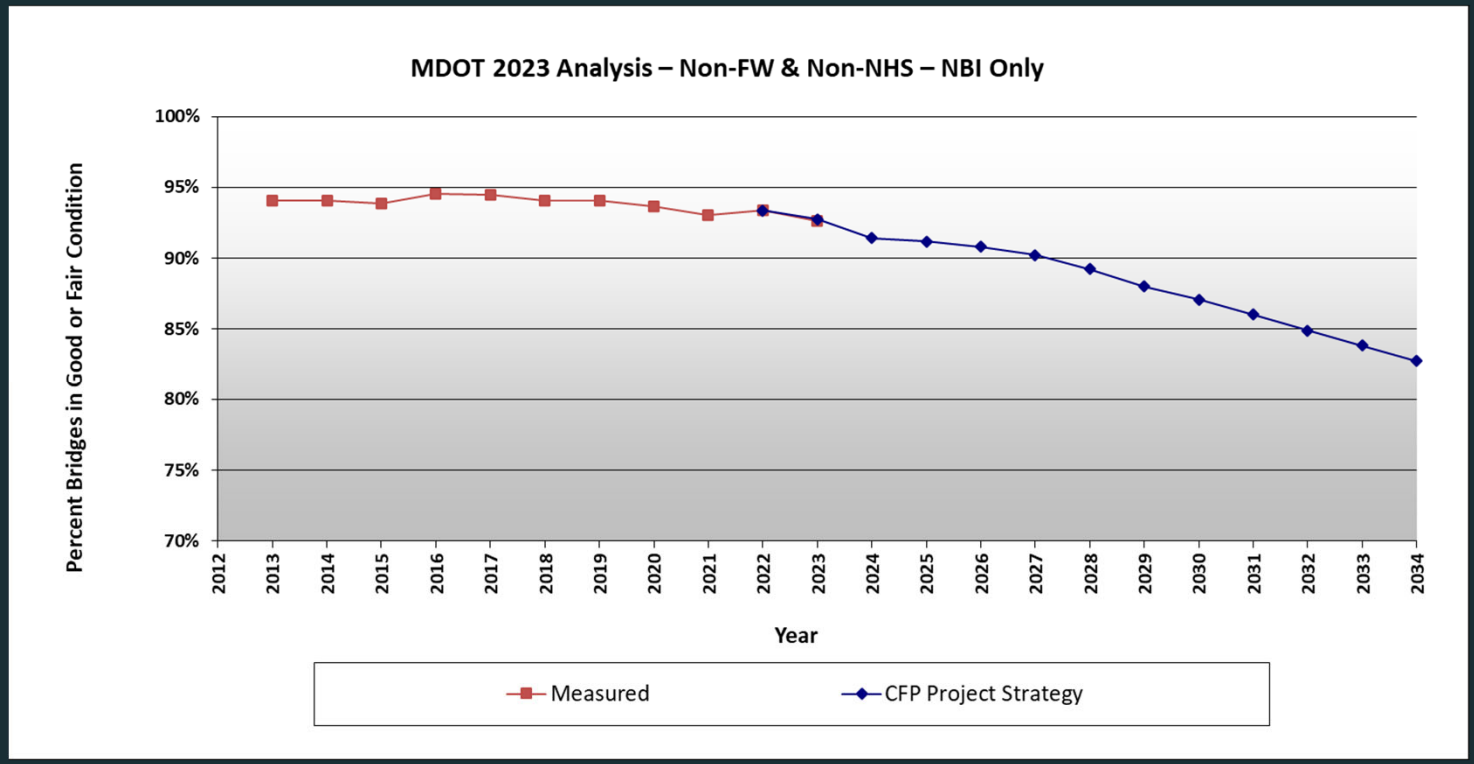
Trunkline Bridge Condition - Freeway



Trunkline Bridge Condition – Non-Freeway



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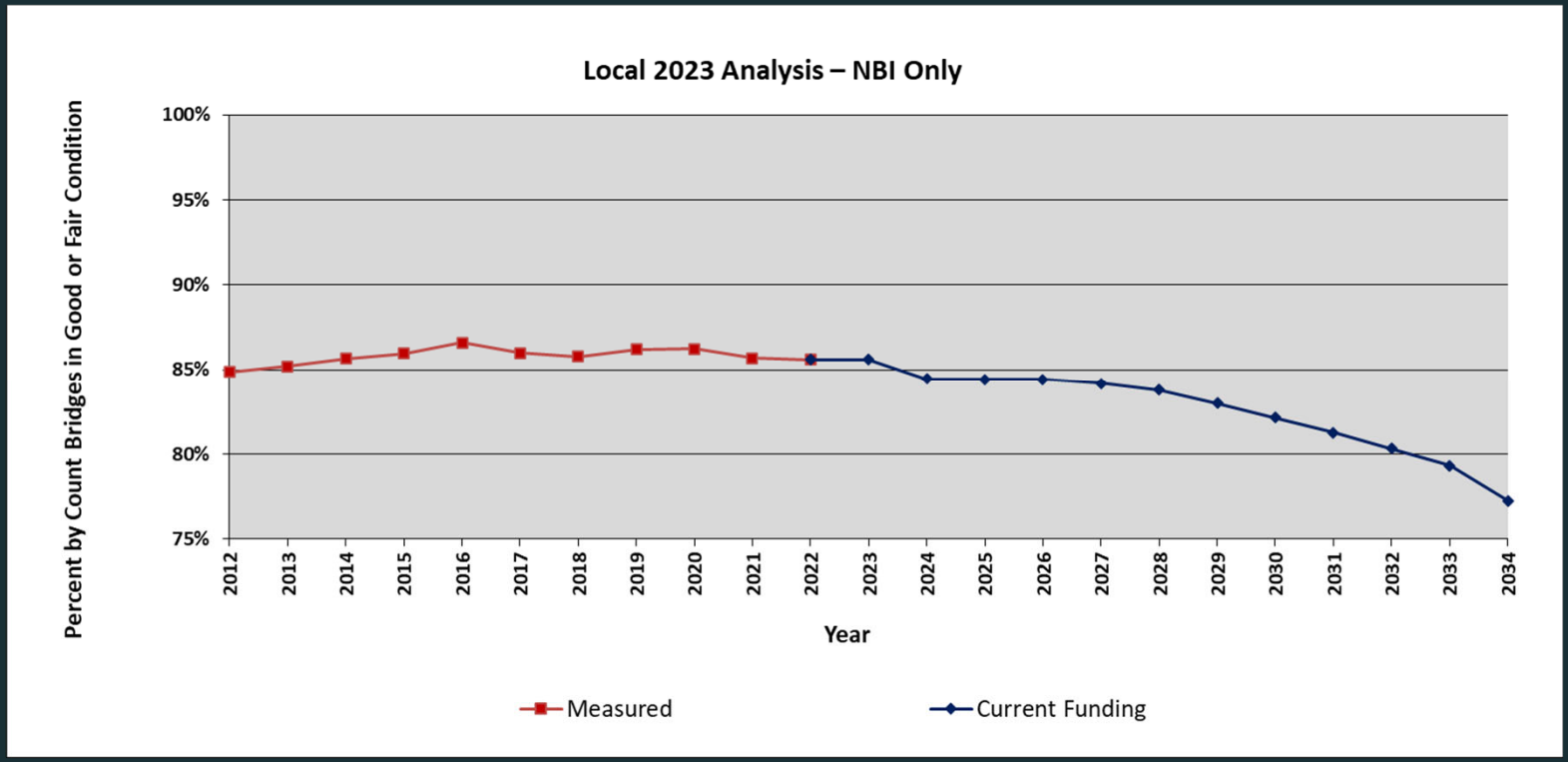
Local Bridge Condition



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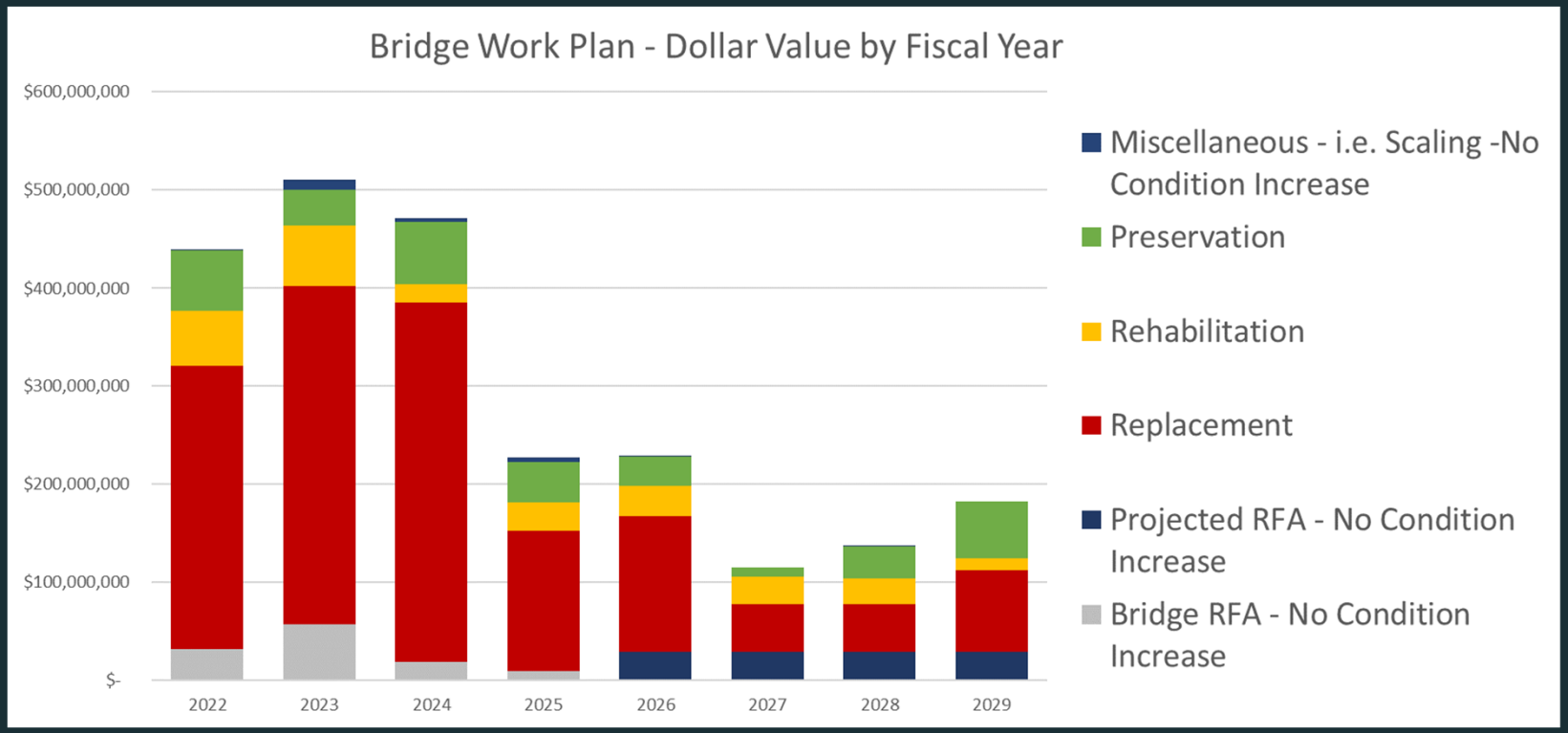
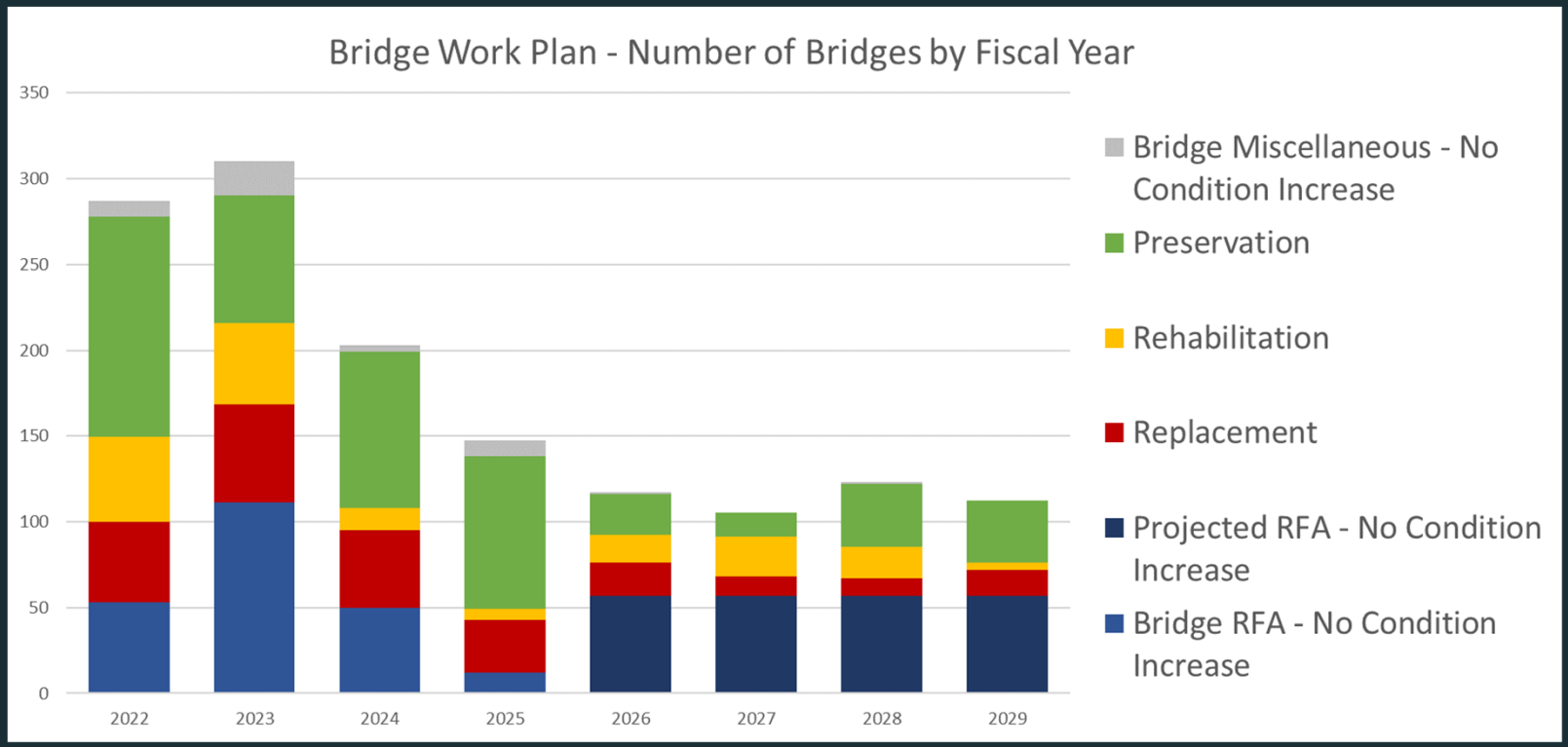
Trunkline Bridge Investment



Trunkline Bridge Projects



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Bridge Scoping Estimates

WORK ACTIVITY	2022 UNIT COST	2023 UNIT COST	% Change
NEW BRIDGE			
Single or Multiple Spans, Grade Separation	$330.00 /SFT	$415.00 /SFT	26%
Single Span, Over Water	$450.00 /SFT	$500.00 /SFT	11%
Multiple Spans, Over Water	$330.00 /SFT	$450.00 /SFT	36%
Precast Culvert	$490.00 /SFT	$540.00 /SFT	10%
NEW SUPERSTRUCTURE			
New Superstructure, Grade Separation	$225.00 /SFT	$295.00 /SFT	31%
New Superstructure, Over Water	$225.00 /SFT	$300.00 /SFT	33%
WIDENING			
Structure Widening, _____ ft	$550.00 /SFT	$630.00 /SFT	15%
NEW DECK			
New Bridge Deck & Barrier	$120.00 /SFT	$150.00 /SFT	25%
DEMOLITION			
Entire Structure, Grade Separation	$65.00 /SFT	$75.00 /SFT	15%
Entire Structure, Over Water	$65.00 /SFT	$95.00 /SFT	46%
DECK REPAIR / TREATMENTS			
Bridge Railing Replacement	$600.00 /FT	$750.00 /FT	25%
Healer / Sealer	$16.00 /SYD	$30.00 /SYD	88%
SUPERSTRUCTURE REPAIR			
Heat Straightening	$45,000.00 EA	$57,000.00 EA	27%
Pack Rust Repair	$850.00 /FT	$1,150.00 /FT	35%
Pin & Hanger Replacement	$13,000.00 EA	$17,000.00 EA	31%
SUBSTRUCTURE REPAIR			
Temporary Supports	$3,000.00 EA	$4,000.00 EA	33%
MISCELLANEOUS			
Concrete Surface Coating	$32.00 /SYD	$47.00 /SYD	47%

Specifications for the National Bridge Inventory (SNBI)

Overview of the SNBI

- Replaces the SI&A Coding Guide
- Provides details for reporting highway bridge data to the NBI
- Data used by FHWA to ensure highway bridge safety, aid in emergency response, and administer a risk-based, data driven, performance management program

Implementation Timeline

Target Date	Action
March 2025	Last SI&A Coding Guide submittal
April 2025	Begin collecting data per the SNBI
March 2028	First complete SNBI data submittal

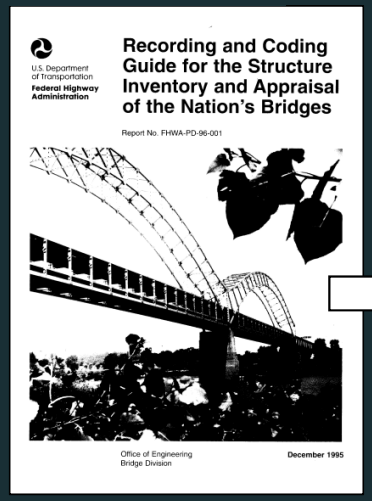
SNBI Data Entry

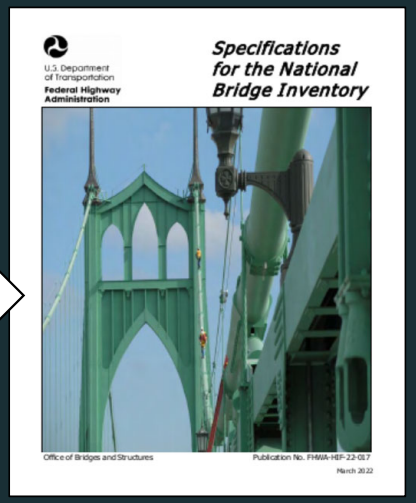
154 total SNBI items

- 54 new items
- 20 discontinued items

SNBI Frequency Categories

- Initial, Each Inspection, Calculated
- 113 items collected during initial inspection





NPRM Cost Response	MDOT Estimate for Local Agencies
1 Hour – 10 Hours per bridge	4 Hours per bridge • Field: Add 1 hour • File/Office: Add 3 hours
$40 - $100 per hour	$100 per hour
$234 per bridge	$400 per LA bridge

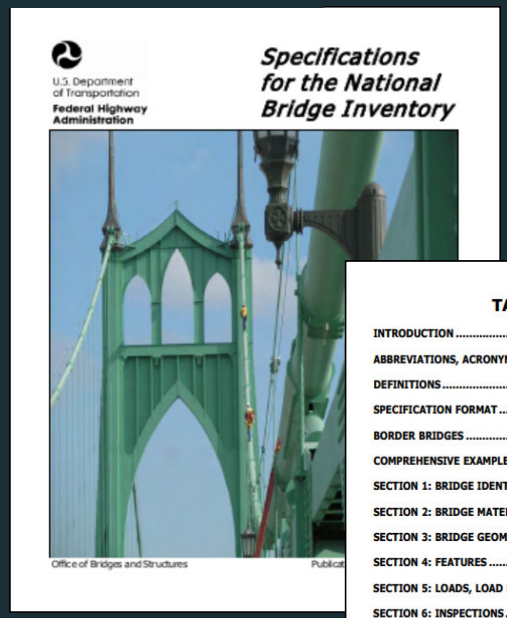
SNBI Data Entry

Data entered by Bridge Owners

- Section 1: Bridge Identification
- Section 2: Bridge Material & Type
- Section 3: Bridge Geometry
- Section 4: Features
- Section 5: Loads, Load Rating & Posting

Data entered by Bridge Inspectors

- Section 6: Inspections
- Section 7: Condition data



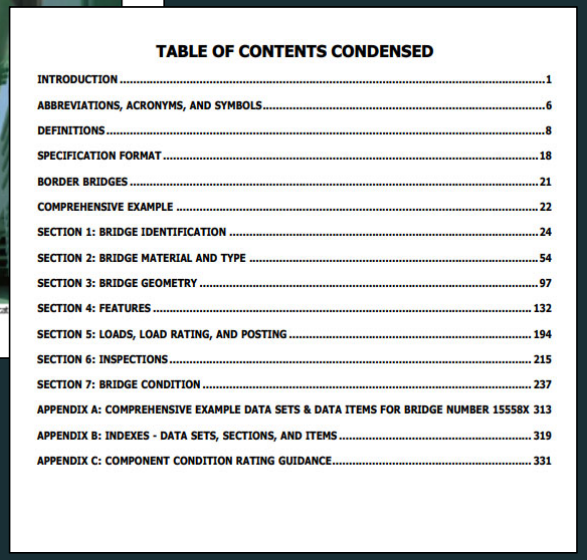


TABLE OF CONTENTS CONDENSED

Load Rating Resources

Center for Technology & Training

CTT:
http://loadrating.michiganltap.org/

Michigan Department of Transportation

MDOT:
https://www.michigan.gov/mdot/programs/bridges-and-structures/structure-preservation-and-management/load-rating

U.S. Department of Transportation
Federal Highway Administration

FHWA:
https://www.fhwa.dot.gov/bridge/loadrating

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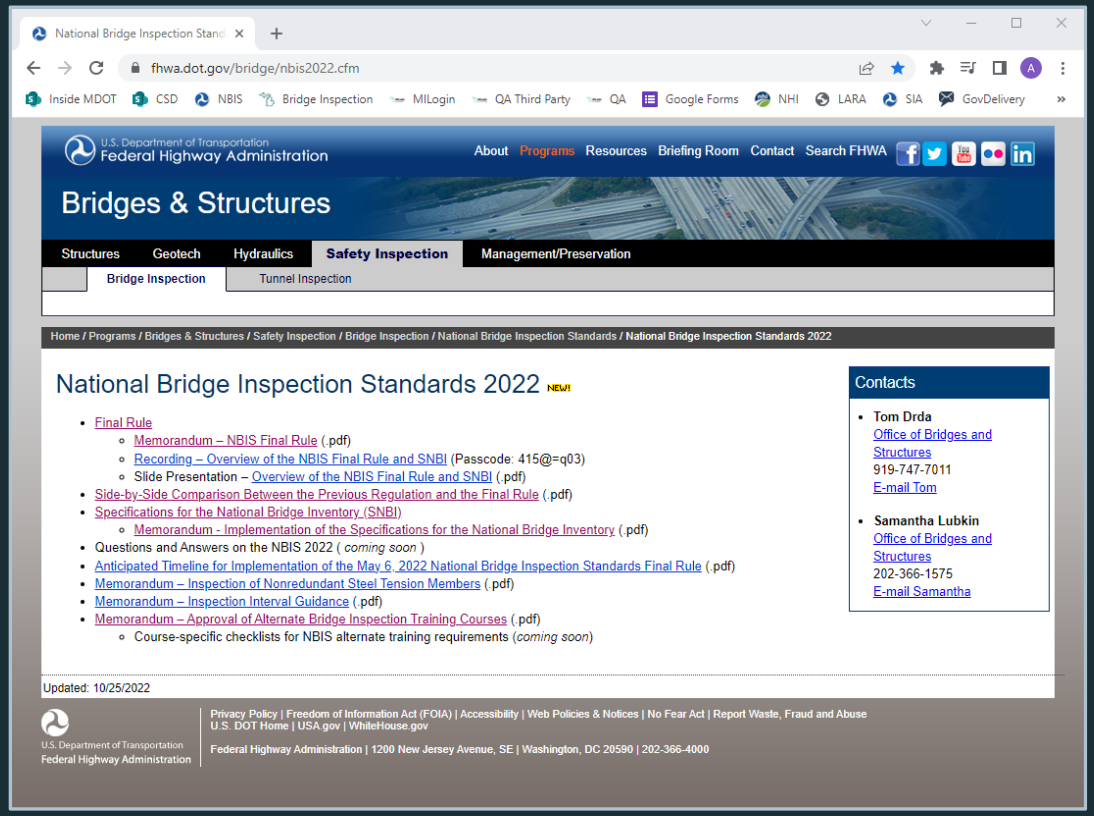
Q & A Resources



NBIS:
https://www.fhwa.dot.gov/bridge/nbis2022.cfm

SNBI:
https://www.fhwa.dot.gov/bridge/snbi.cfm

Submit questions to:
MDOT-MiBRIDGE-Admin@michigan.gov

Responses posted at:
www.michigan.gov/BridgeInspect

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Bridge Preservation

Structure Preservation

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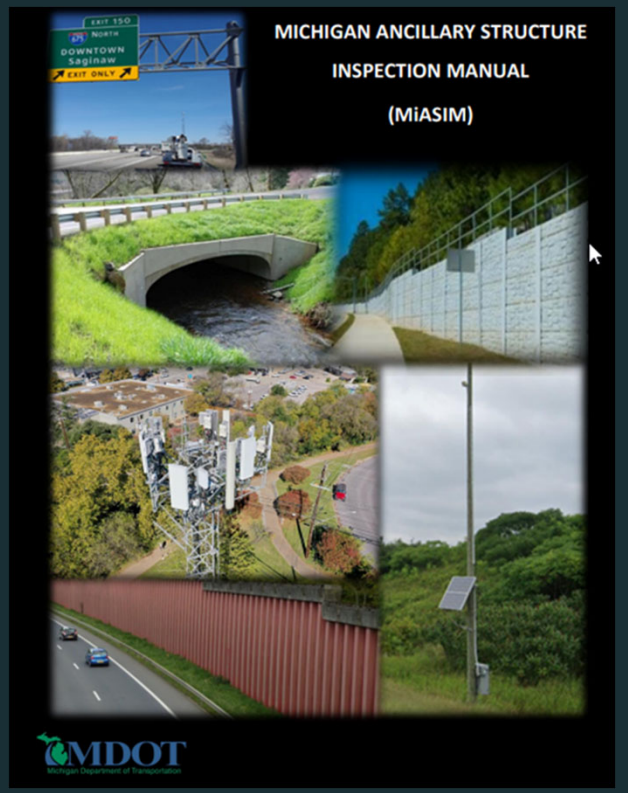
Ancillary Structures Asset Management Program

Key Accomplishments to Date

- Developed database framework
- Inspected 27% of culvert assets
- Inspected 58% of retaining walls, 70% sign structures
- Released draft Michigan Ancillary Structures Inspection Manual (MiASIM)
- Developed an RFA Process



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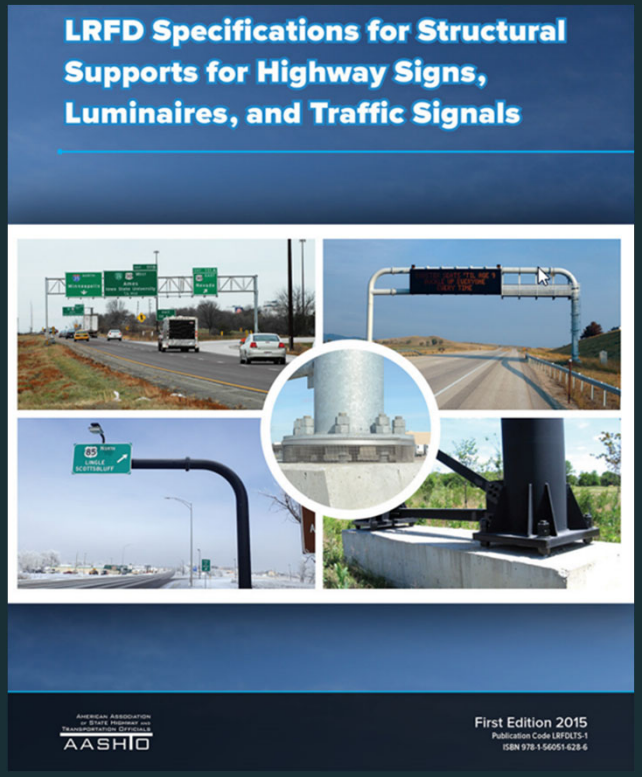
Ancillary Structures Asset Management Program

Key Accomplishments to Date

- Updated standards to LRFD for October 2023 letting (and various other updates)
- Completed culvert scoping reports and a culvert design project
- Completed an emergency retaining wall design project
- Established steering committee



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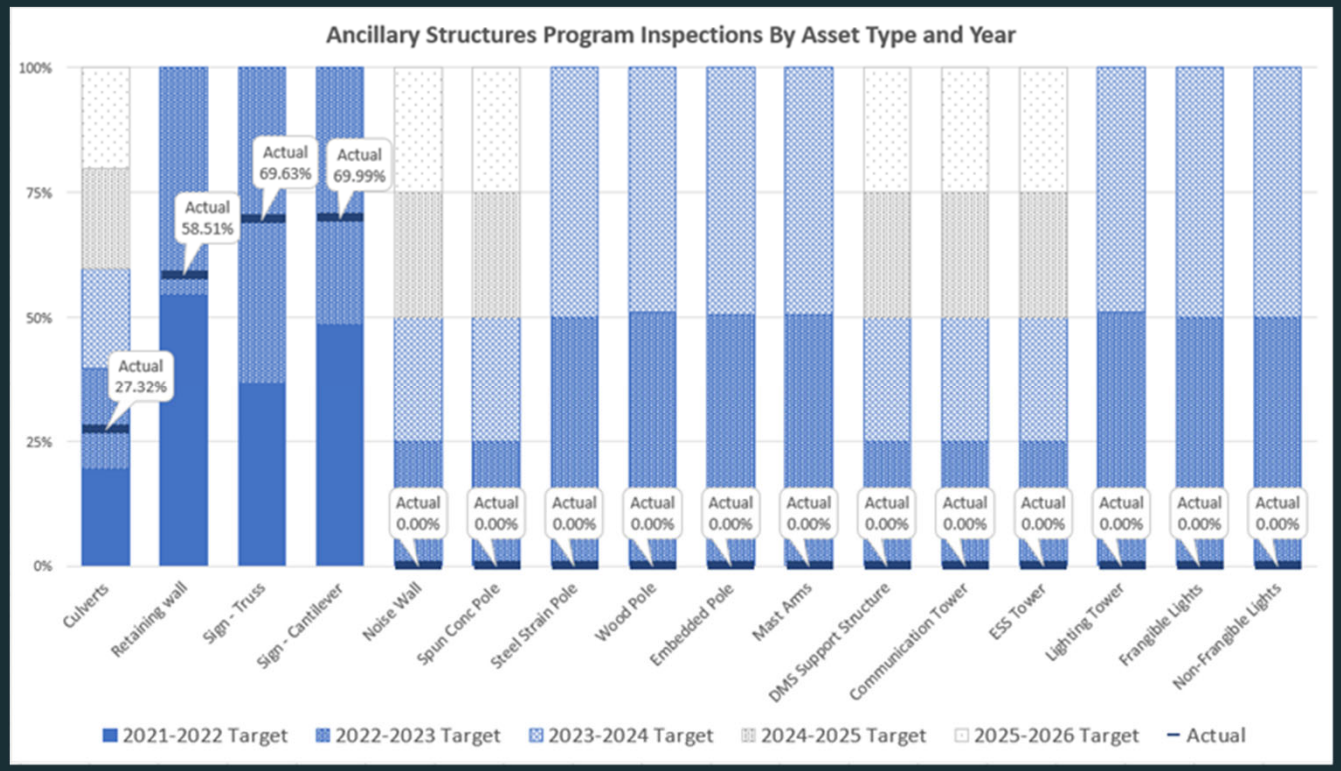
Ancillary Structures Asset Management Program



Near Term Goals

- Roll out inspections of remaining 12 asset types by May 2023
- Transition to AASHTOWare BrM Framework
- Implement asset labeling system

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January 2023 Public Involvement Open House

Need for robust outreach:

- Long, controversial project history
- Recent inaccurate press
- Trust issues with stakeholders

Strategies:

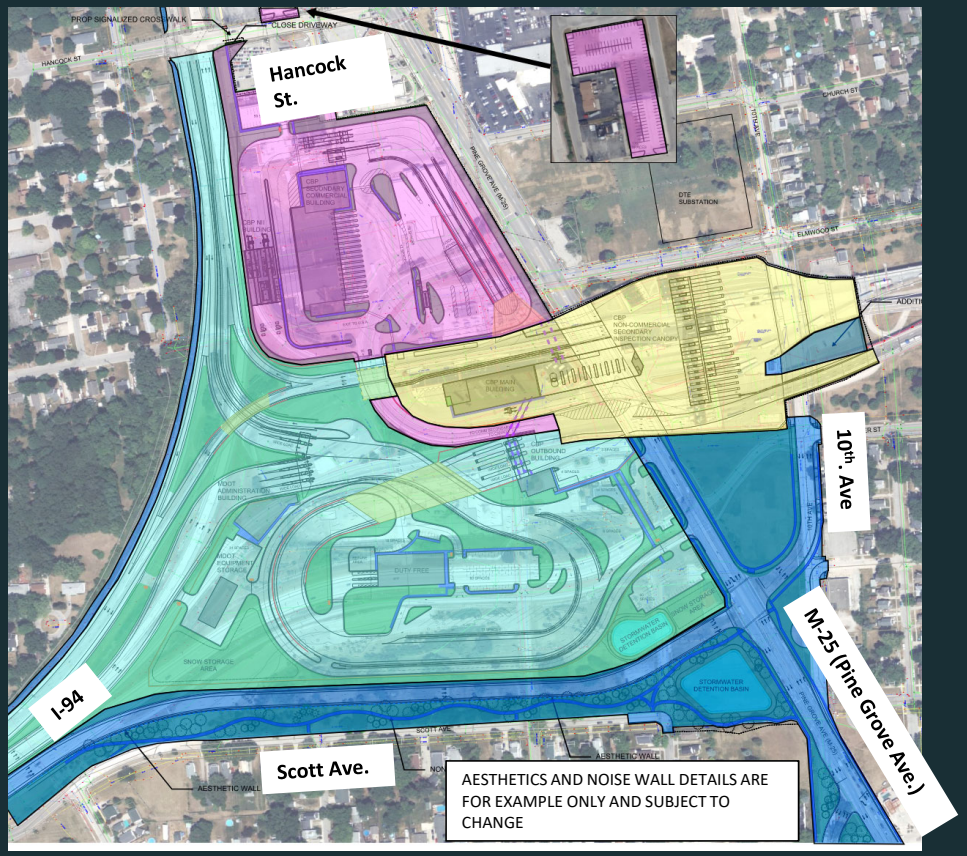
- Mass mailing
- Door hangers
- Press releases/media outreach
- Social media

January 2023 Public Involvement Open House

Results:

- Over 300 attendees
- Nearly 70 comment cards
- Rebuilding trust with stakeholders
- Significant post meeting outreach to the PM for additional input

Moving Forward



Construction Phases

- Early Works Package
- Package 1
- Package 2
- Package 3

Blue Water Bridge

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Bridge Bundle Pilot Successes

Goal	Success
Reduce the number of serious and critical bridges	19 superstructure replacements opened in only 60-90 days (18 were serious or critical)
Develop Michigan's bridge bundle pilot into a scalable and repeatable program	CRRSAA bundle was developed and will build from lessoned learned from pilot
Utilize innovations including strategic partnerships between MDOT, MML, CRA and individual bridge owners	Press Brake Steel Tub Girders used by Design Builder
	Partnerships with Local Champions, project Ombudsman, Project Consultants and Design Build Team

Still in progress:

- Asset management plans for each bridge
- Benefit/Cost Analysis

Congratulations to our Retirees

Duong Pham – 5/31/22

Dick Endres – 7/29/22

Julie Townsend – 12/29/22

Ali Mahdavi – April, 2023

Thank you for your years of service!

BUREAU of BRIDGES and STRUCTURES

Opportunities to Make a Difference

Structure Design

Multiple Design Engineers

Specialist Design Engineer

Design Unit Leader

Geotechnical

Geotechnical Engineer

Specialist Geotechnical Engineer

Structure Management

Load Rating Unit Leader

Structure Preservation

Ancillary Structures Specialist Engineer

BUREAU of BRIDGES and STRUCTURES

Questions?

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Rebecca Curtis

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BOBS Administration
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Angelica Garcia
Joel Doty

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Brad Wagner

- Structure Construction — **Rick Liptak**
- Structure Design — **Kyle Kopper**
- Geotechnical — **Ryan Snook**

Structure Program Division
Mike Halloran

- Structure Management — **Creightyn McMunn**
- Structure Preservation — **Brian Zakrzewski**
- Structure Program Development — **Amy Gill**, **Matt Moulton**

Blue Water Bridge
Amy Winn-VanHoeck

- BWB Projects — **Carrie Warren**

Bridge Bundling
Sue Datta

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