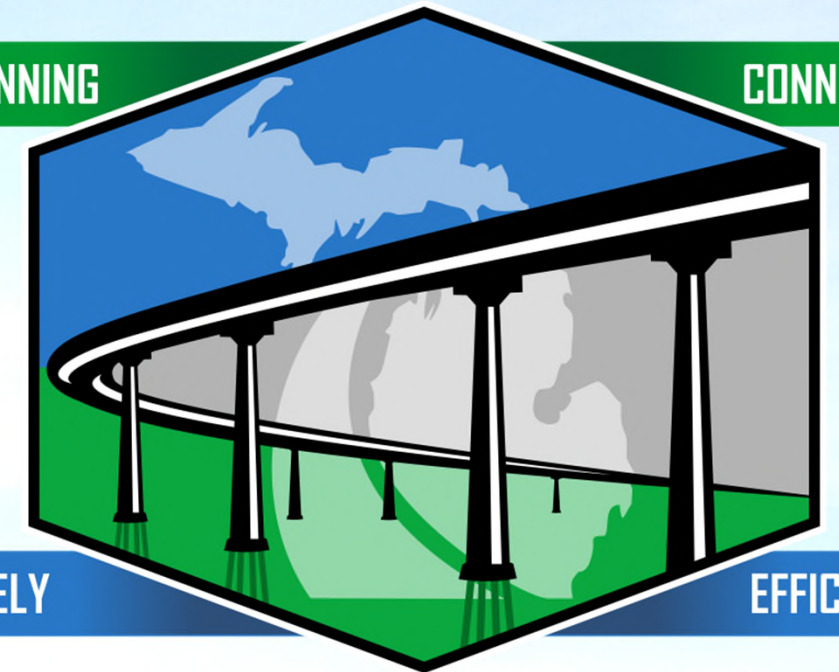


# BUREAU of BRIDGES

SPANNING

CONNECTING



SAFELY

EFFICIENTLY

# and STRUCTURES

## House Transportation Appropriations Committee

December 10, 2019

Rebecca Curtis, MDOT Deputy Chief Bridge Engineer

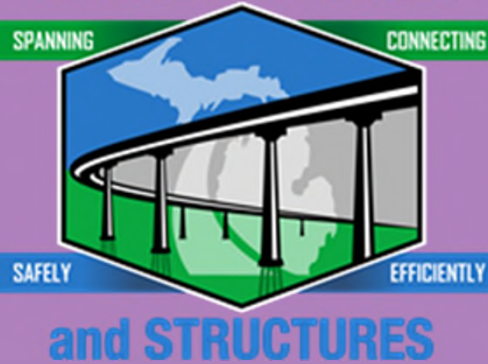
Matthew J. Chynoweth, MDOT Chief Bridge Engineer





- **Governing Bridge Regulations**
- **Michigan Bridge Inventory**
- **MDOT Big Bridges**
- **MDOT Bridge Funding**
- **Local Agency Bridges**
- **Local Agency Bridge Funding**
- **Michigan Bridge Condition**

## **BUREAU of BRIDGES**



# Inspection Regulations

## § 650.315 Inventory.

Each State or Federal agency must prepare and **maintain an inventory of all bridges** subject to the NBIS. Certain Structure Inventory and Appraisal (SI&A) data must be collected and retained by the State or Federal agency for collection by the FHWA as requested. A tabulation of this data is contained in the SI&A sheet distributed by the FHWA as part of the “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges,” (December 1995) together with subsequent interim changes or the most recent version. Report the data using FHWA established procedures as outlined in the “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.”



# Inspection Regulations



## § 650.307 Bridge inspection organization

Each State transportation department **must inspect**, or cause to be inspected, **all highway bridges located on public roads** that are fully or partially located within the State's boundaries, except for bridges that are owned by Federal agencies.

Each State transportation department or Federal agency must include a bridge inspection organization that is responsible for the following:

Statewide or Federal agency-wide **bridge inspection policies and procedures, quality assurance and quality control, and preparation and maintenance of a bridge inventory.**

**Bridge inspections, reports, load ratings and other requirements of these standards.**



# NBIS Compliance Issues

- Waterway Documentation
  - Implementation began in 2019
    - **8** agencies in non-compliance
- New Federal Requirement to install posting signs within 30 days
  - Implementation began in October
    - **6** agencies in non-compliance in November
    - **3** agencies in non-compliance in December



# NBIS Proposed Rule Making – Inspection Changes

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MDOT additional costs: **\$2.0 M per year**

Local Agency additional costs: **\$1.0 M per year**

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- Structures with rating of **3** or less must be inspected every **12** months [currently required every **24** months].
- Scour Critical Structures must be inspected every **12** months [currently required every **24** months].
- Scour Critical Structures must have a diving inspection every **36** months [currently required every **60** months].
- Fracture Critical Structures must be inspected every **12** months [currently required every **24** months].
- Post-Construction inspections must be completed **before** structure is open to traffic [currently required within 180 days of opening to traffic].
- Post-Construction Underwater Diving inspection must be completed **within 6 months** of opening to traffic [currently not required as part of post-con inspection].

# Michigan Bridge Inventory – by Count

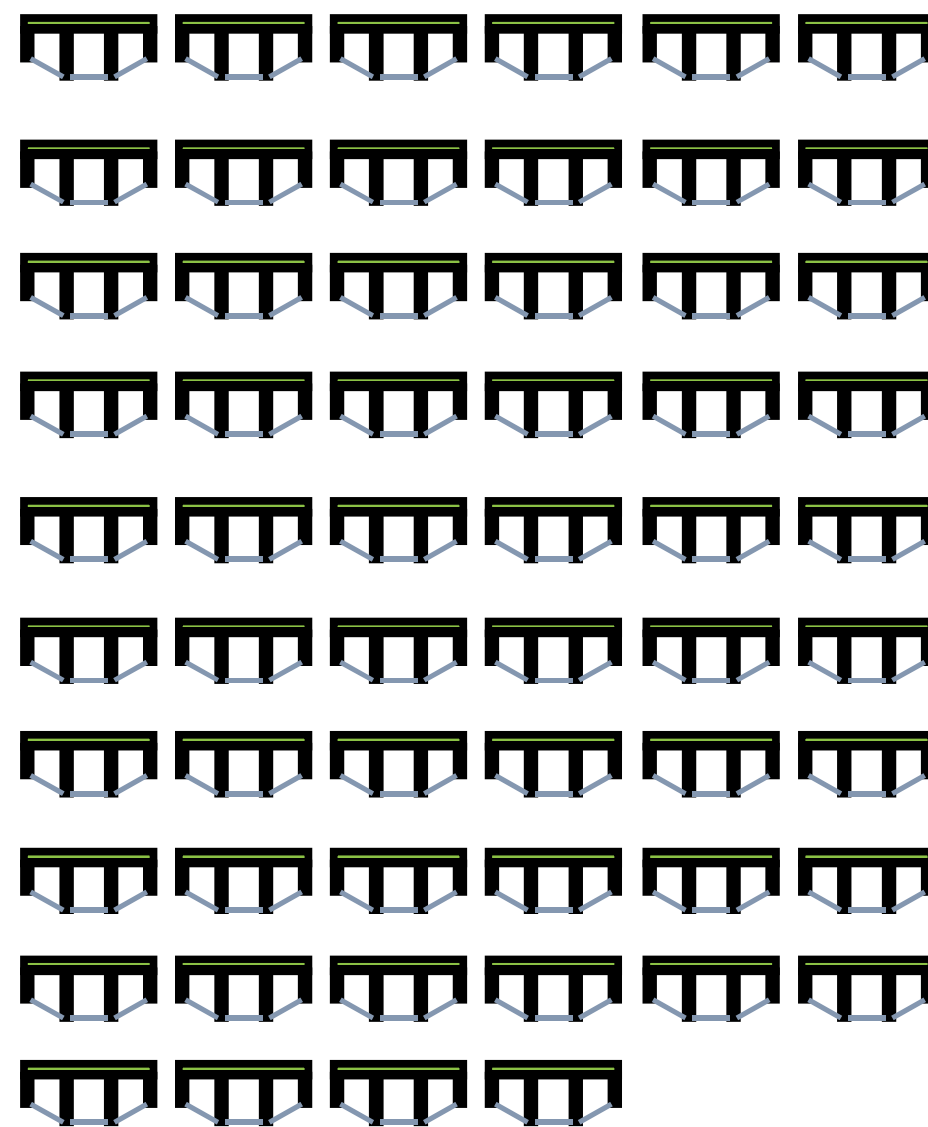
MDOT

**4536**



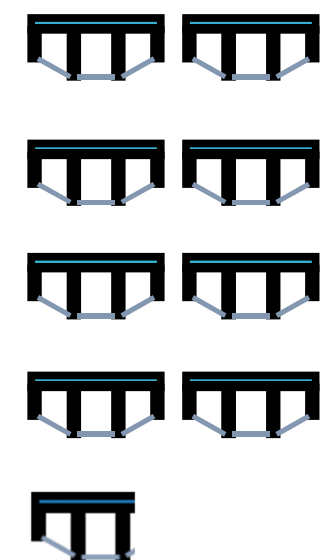
Counties

**5800**



Cities & Villages

**870**



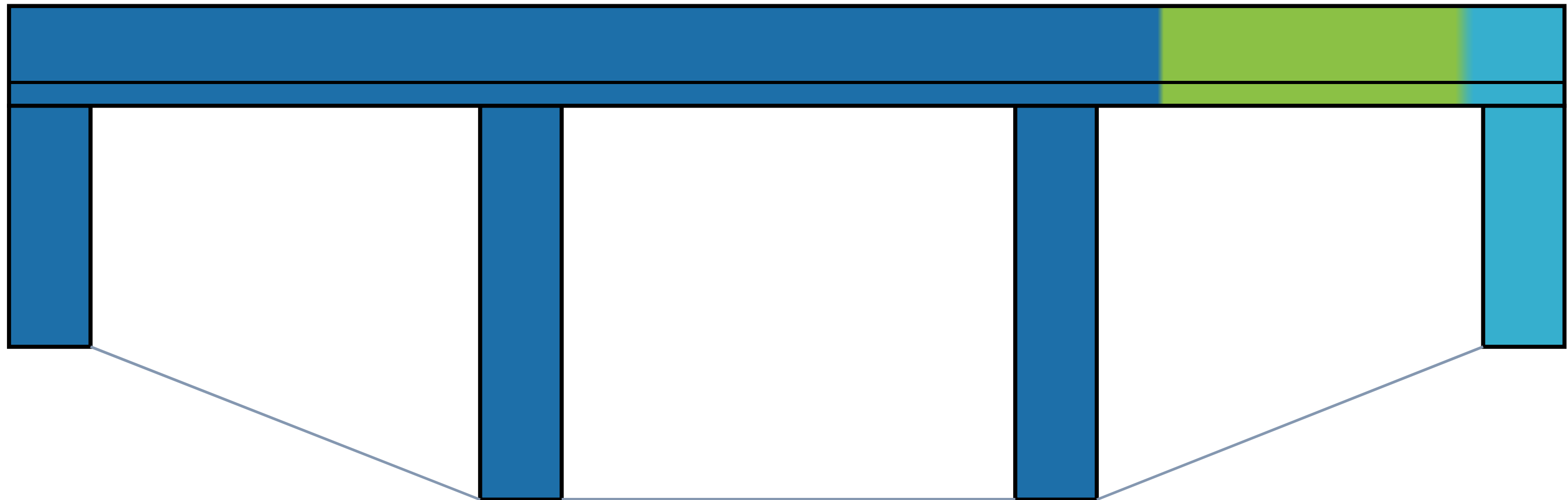
# Michigan Bridge Inventory – by Deck Area

---

MDOT  
**50.9 M ft<sup>2</sup>**

Counties  
**12.9 M ft<sup>2</sup>**

Cities &  
Villages  
**4.8 M ft<sup>2</sup>**





# Michigan Bridge Inventory – by Traffic Volume

MDOT

**81.5 M cars per day**



Counties

**12.0 M cars per day**



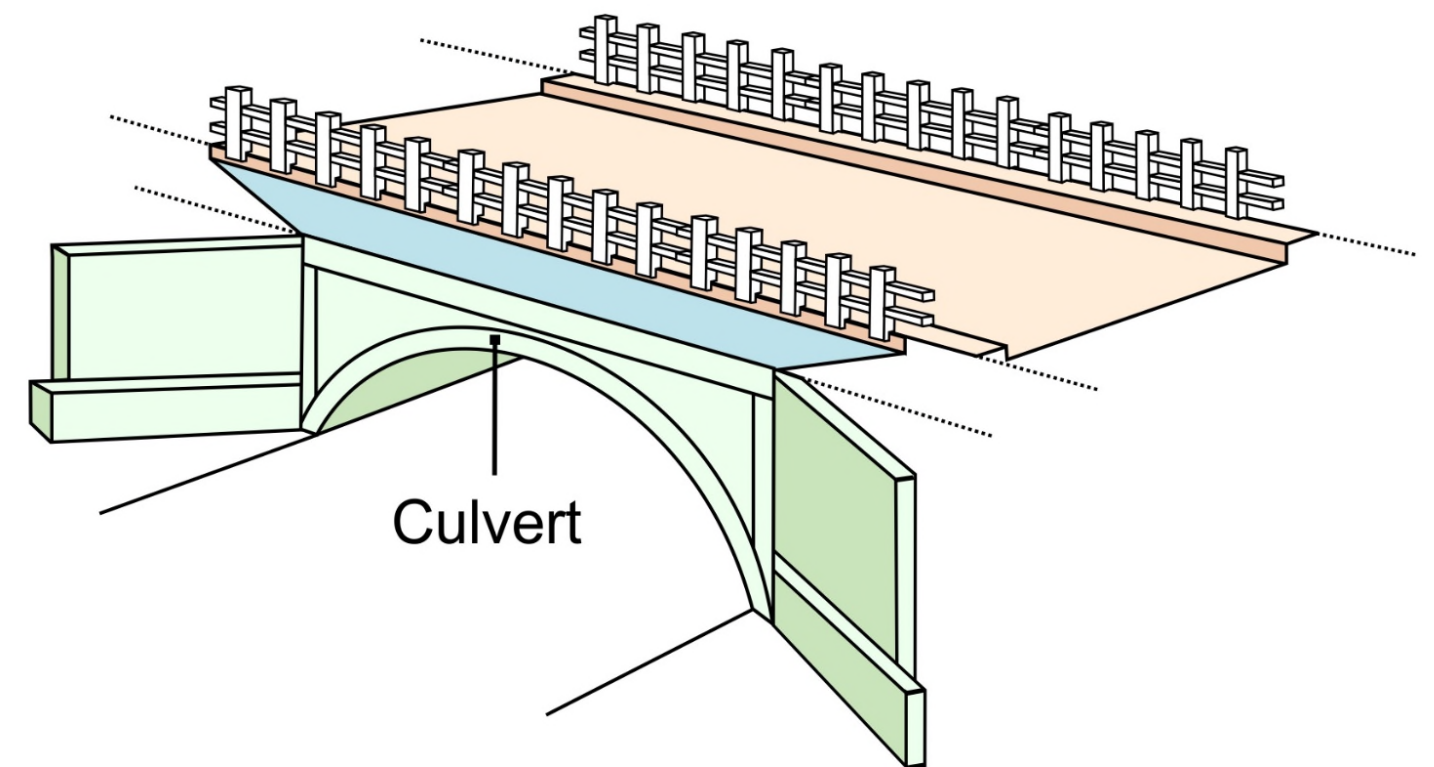
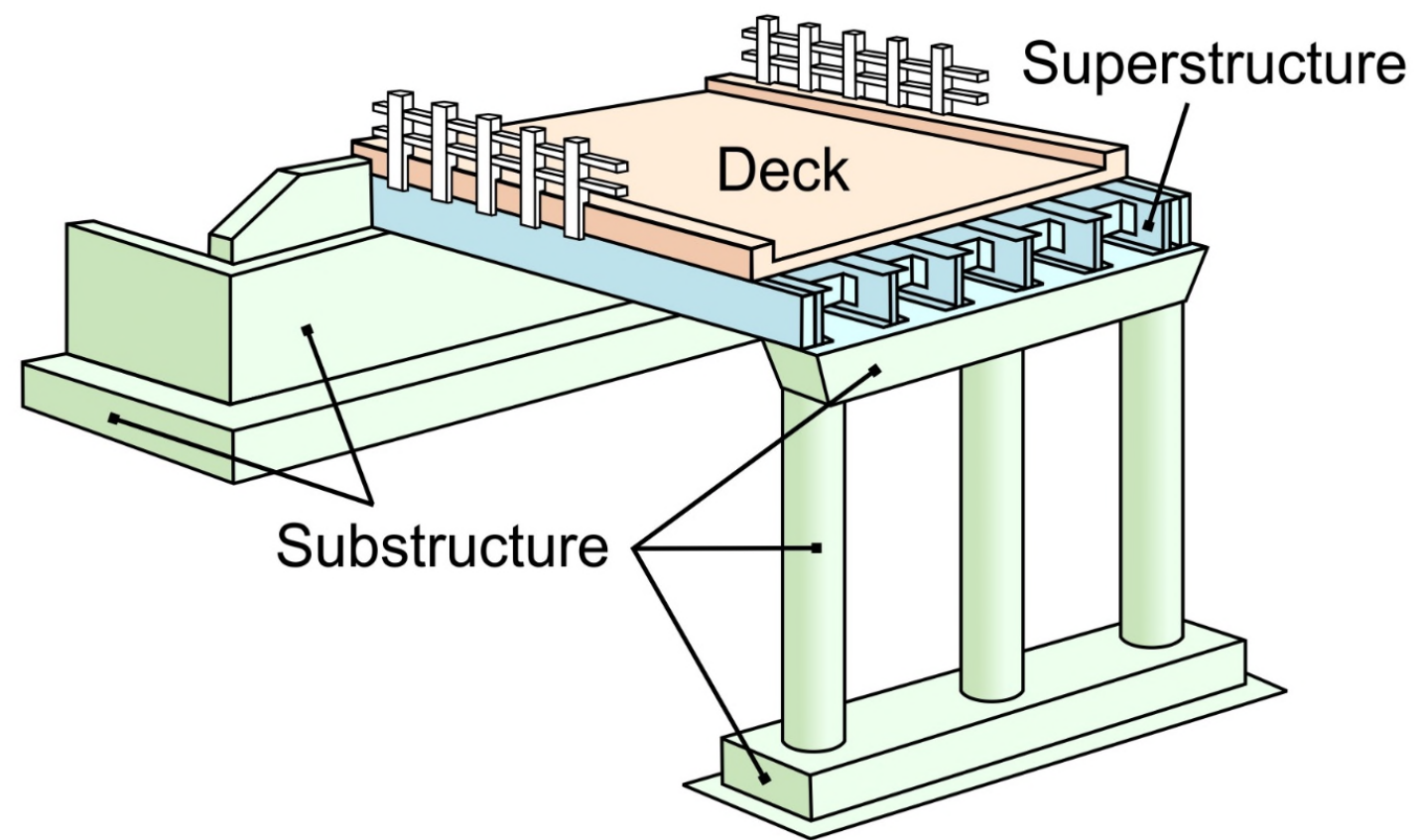
Cities & Villages

**5.2M cars per day**



# How to Measure Bridge Conditions

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# Good Condition

---



Deck



Superstructure



Substructure

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NBI Rating 7, 8 or 9— Routine Maintenance Candidate —  
\$40/ft<sup>2</sup> for Routine or Preventive Maintenance

# Fair Condition

---



Deck



Superstructure



Substructure

---

NBI Rating 5 or 6 – Preventive Maintenance or Minor Rehabilitation Candidate - \$100/ft<sup>2</sup> for Rehabilitation



# Poor Condition

---



Deck



Superstructure



Substructure

---

NBI Rating 4 or less – Major Rehabilitation or Replacement Candidate -  
\$725/ft<sup>2</sup> for Replacement



# Closed Bridges

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Deck



Superstructure



Substructure

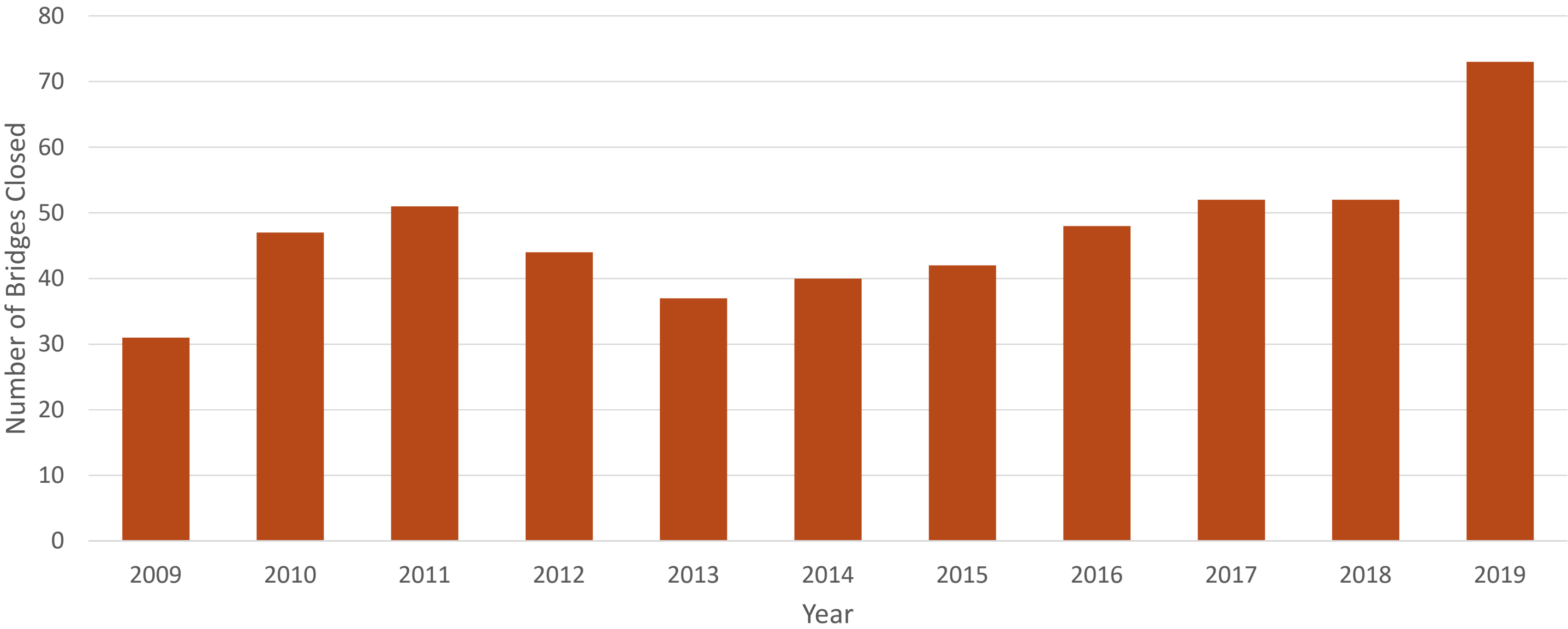
---

Emergency Repairs or Closure until Major Rehabilitation or Replacement Candidate - \$725/ft<sup>2</sup> for Replacement in addition to economic impacts



# Closed Bridges – Full Closures

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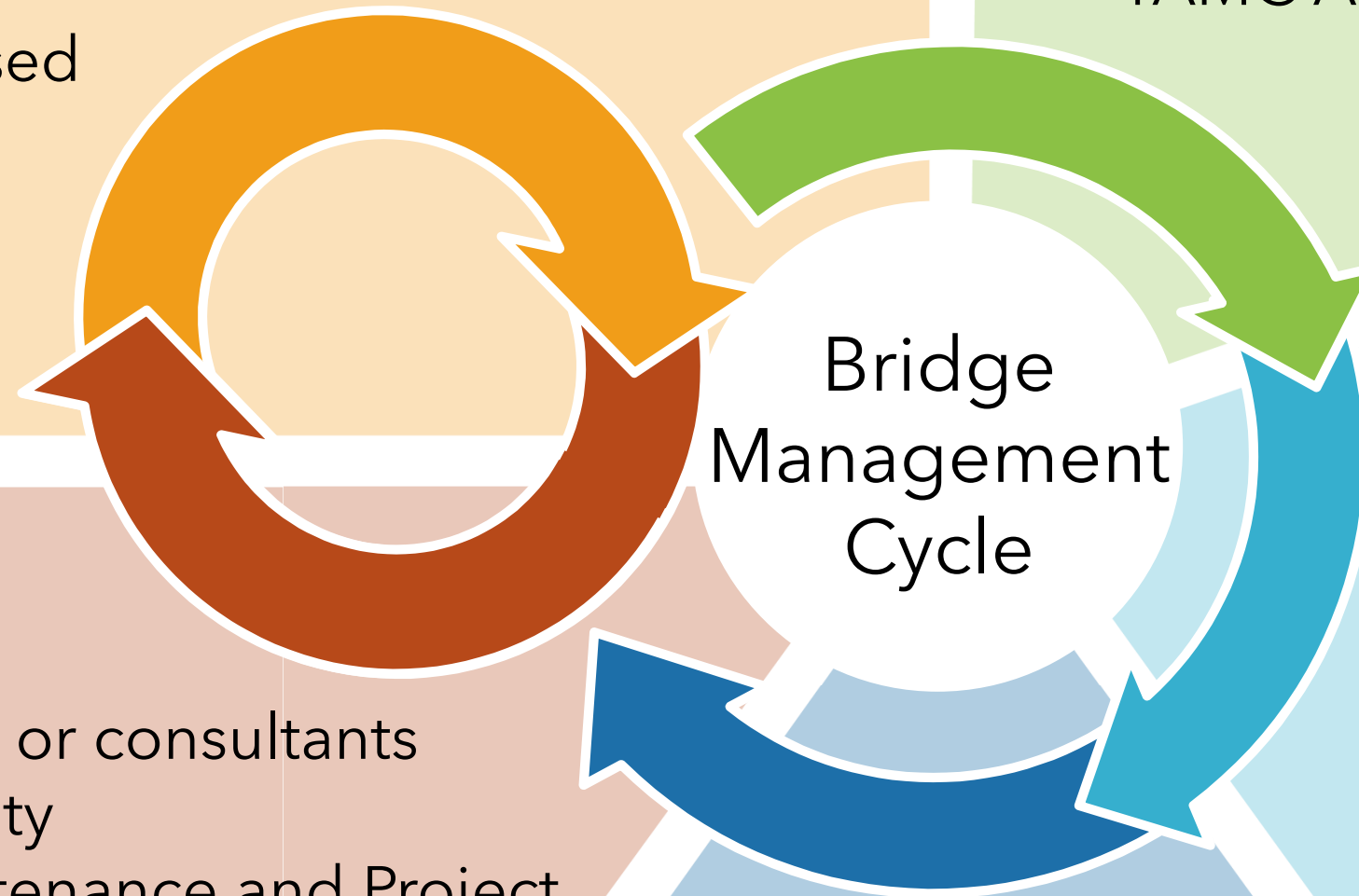


## Maintenance

- Direct Force
- Contract Work
- Cyclical
- Condition Based

## Asset Management/Project Selection

- MDOT Call for Projects
- Local Agency Bridge Advisory Board
- TAMC Asset Management Plans



## Design

- AASHTO Standards
- MDOT Bridge Design Manual

## Inspection

- 23 CFR 650
- In-house staff or consultants
- Maintain Safety
- Identify Maintenance and Project Needs to Maintain Structure

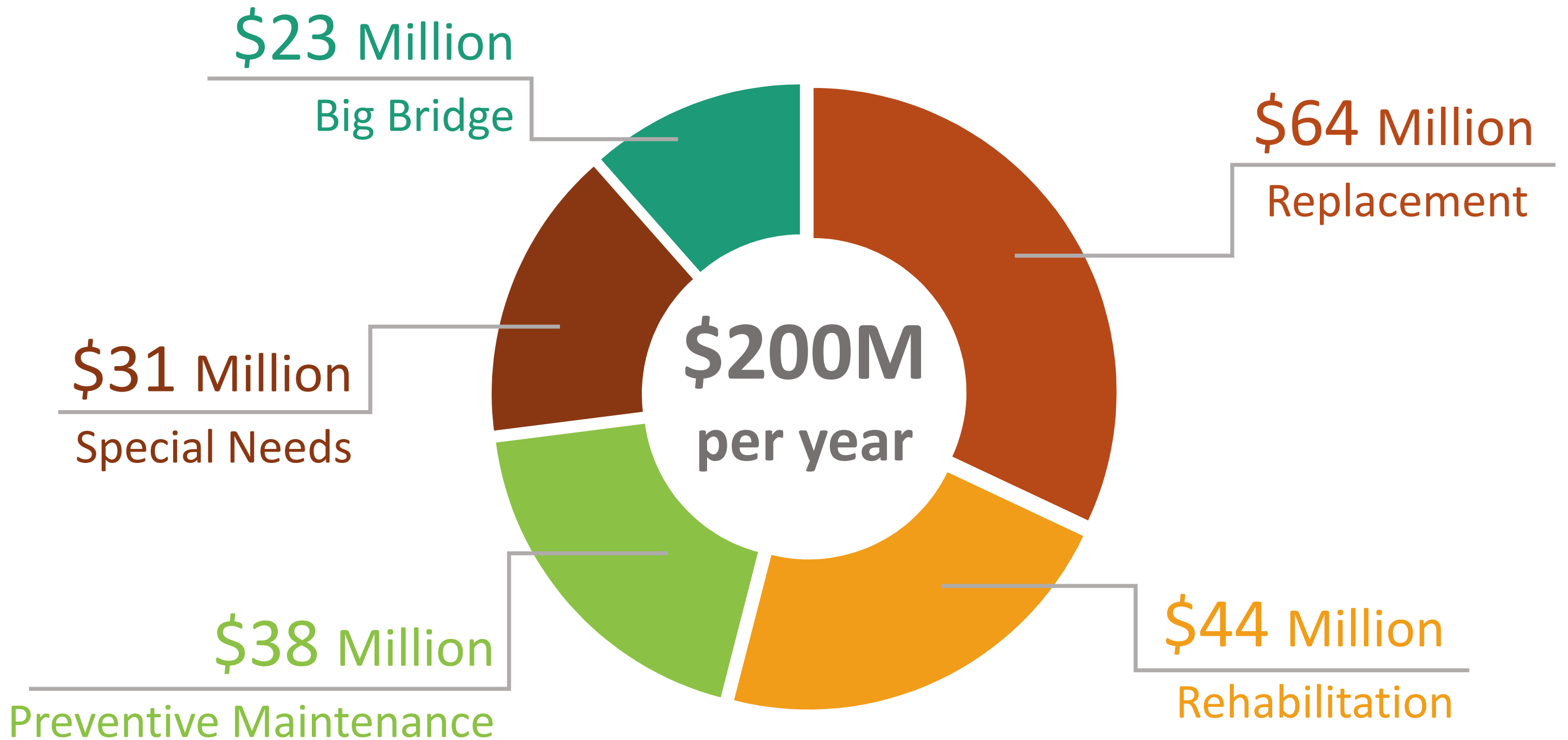
## Construction

- MDOT Standard Specifications
- Contract Documents
- Federal Oversight



# MDOT 5 Year Planned Bridge Funding

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# MDOT Big Bridges





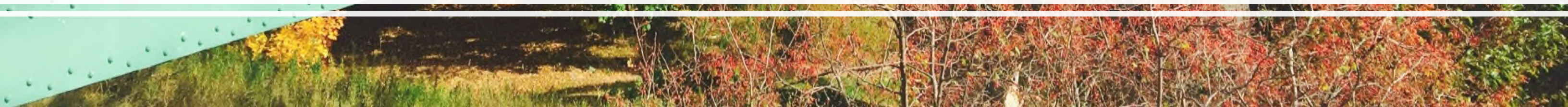
# MDOT Big Bridges







# MDOT Big Bridges





# Complex Bridges





# Local Agency Big Bridges

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- **373** Per the Local Bridge Program policies

- A Large Bridge is a bridge where the project costs exceed 50% of the allocation for a region in a single year.

- **12** Moveable Bridges

- **143** Complex Bridges

- Arch-deck filled spandrel, Deck Truss, Thru Pony Truss and Thru Arch Truss Bridges



# Local Agency Big Bridges

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**\$3-5 M per year**

Available for Local Agency Big Bridges

**\$58 M per year**

Needed for Local Agency Big Bridges

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**38**

Number of LA  
Big Bridges in  
Poor Condition

**\$230 M**

Estimated\*  
Replacement Costs to  
Repair Poor Bridges

**169**

Number of LA  
Big Bridges in  
Fair Condition

**\$838 M**

Estimated\*  
Rehabilitation Costs  
to Repair Fair Bridges

**166**

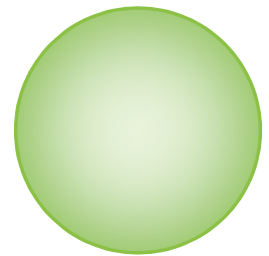
Number of LA  
Big Bridges in  
Good Condition

**\$688 M**

Estimated\* Preservation  
Costs to Maintain Good  
Bridges

# Local Agency 2019 Call for Projects

≈\$50 M



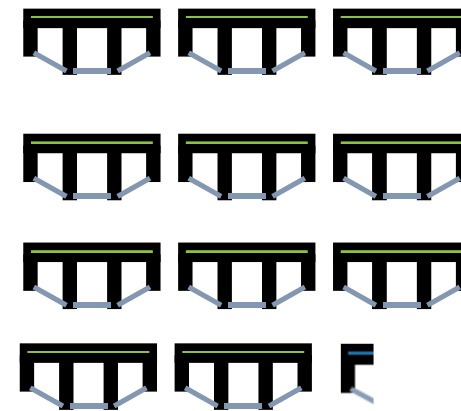
Funding Available



\$291 M\*

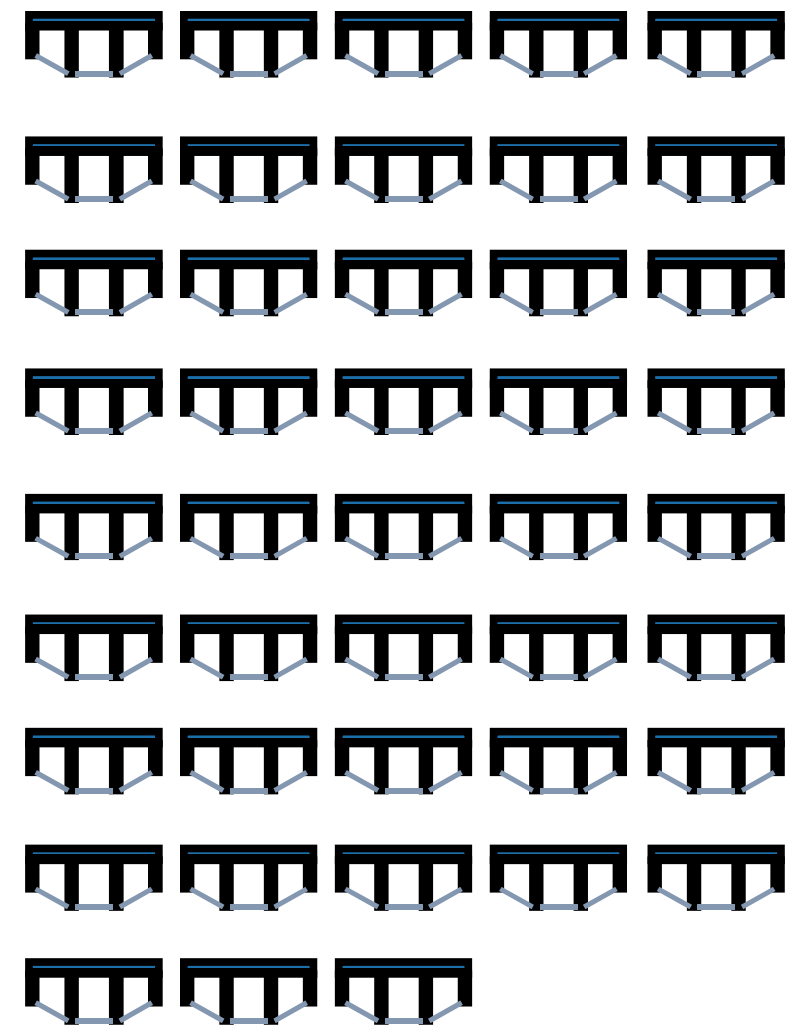
Total Applications

112 bridges



Funding Available

430 bridges\*

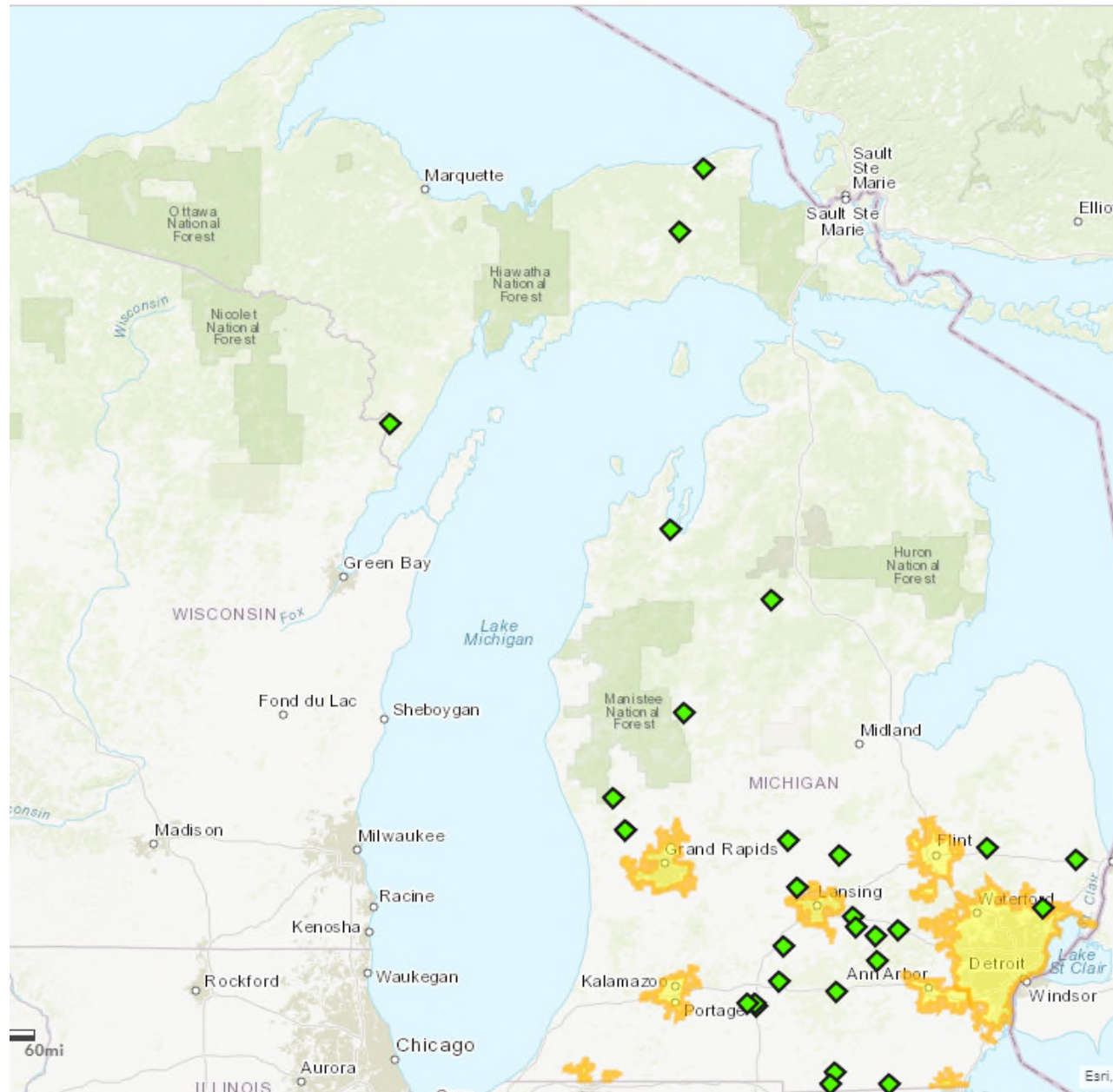


Total Applications

\* Only represents Applications, not **Need**. Agencies are limited in the number of Applications



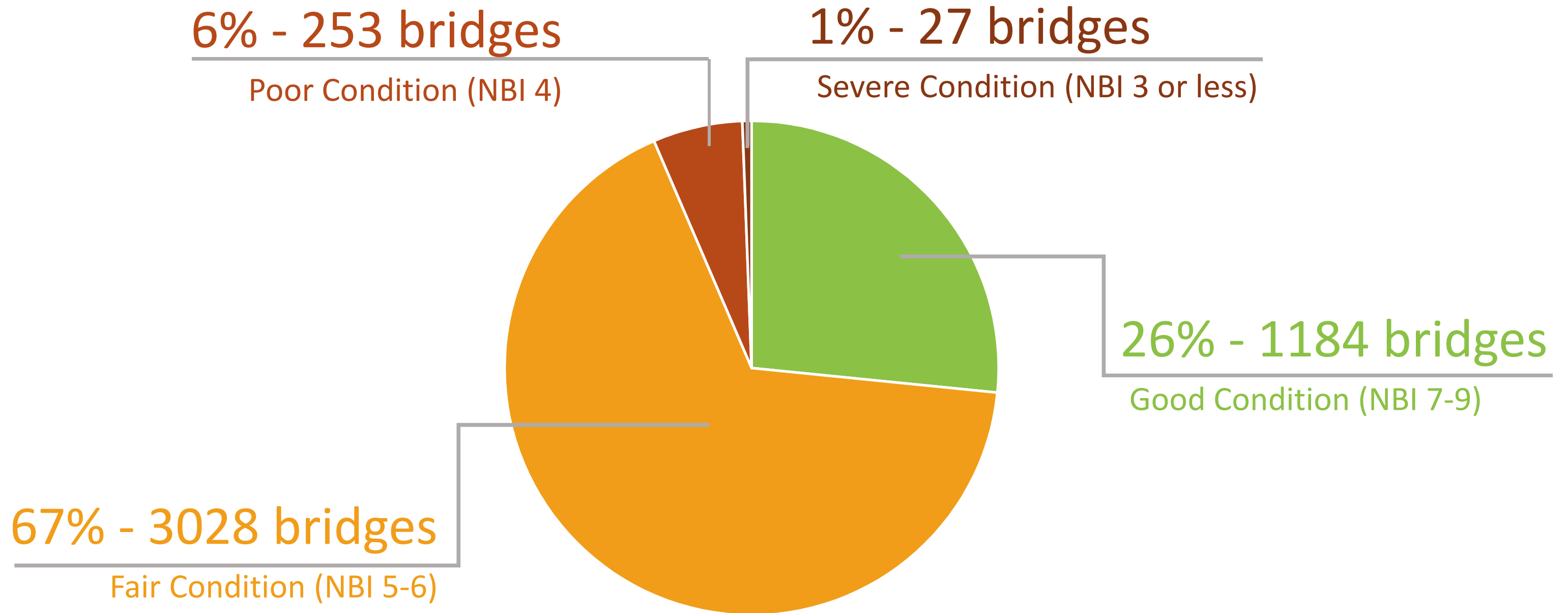
# Local Agency Bridge Bundling Pilot



- **25-30 Local Agency Bridges**
- **~ \$23 million program**
- **Rural bridge focus**
- **Selected serious and critical bridges not requiring extensive permitting**
- **Collaboration between MDOT and CRA/MML**
- **Design/Build Procurement**
- **September 2020 letting**

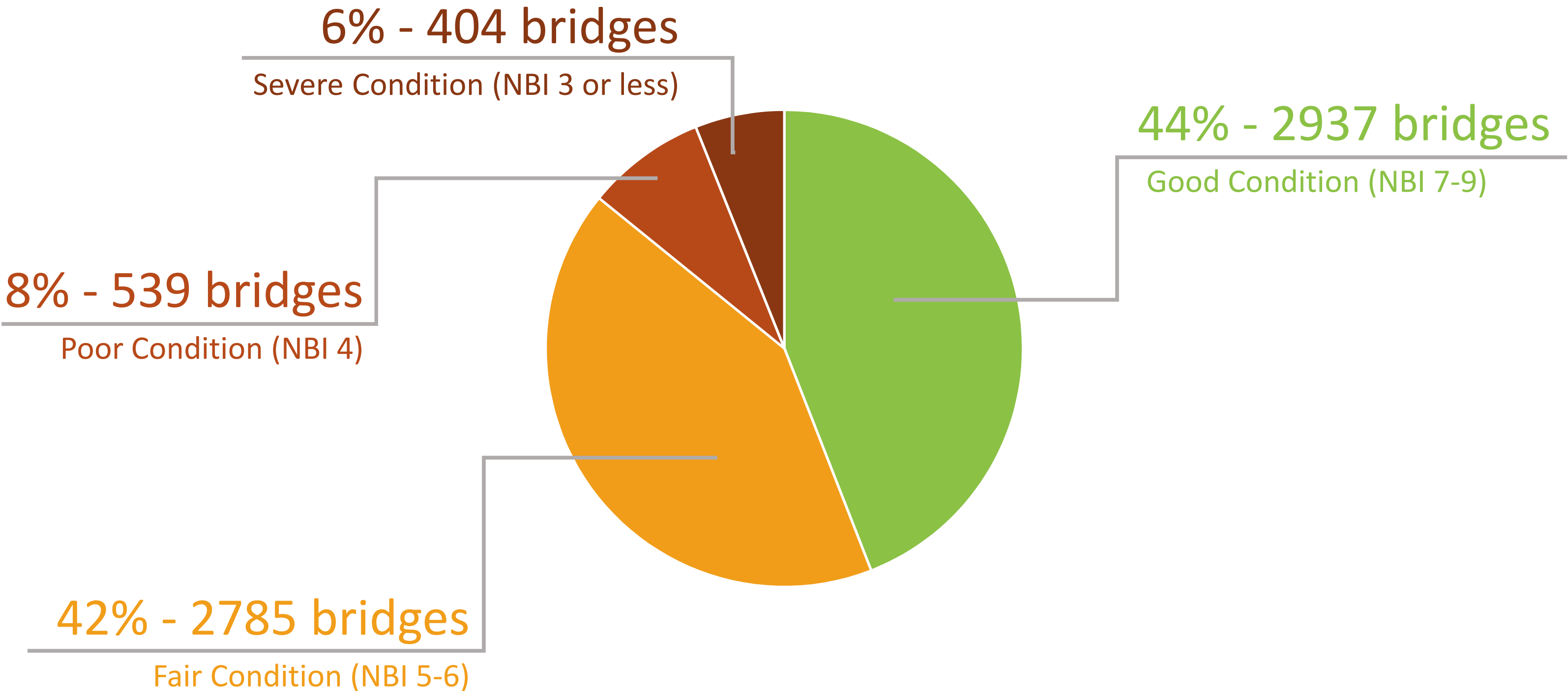
# MDOT Bridge Condition

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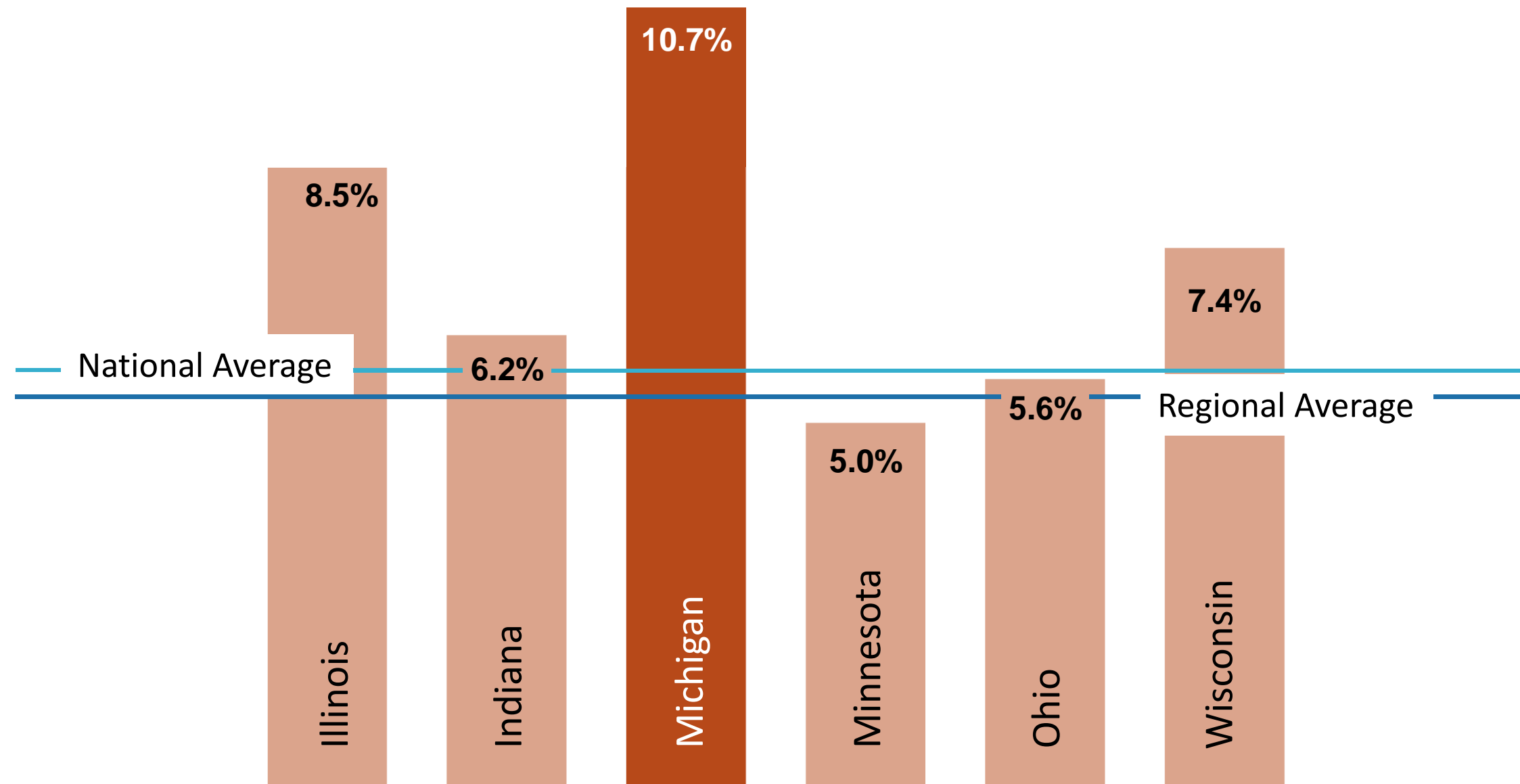
# Local Agency Bridge Condition

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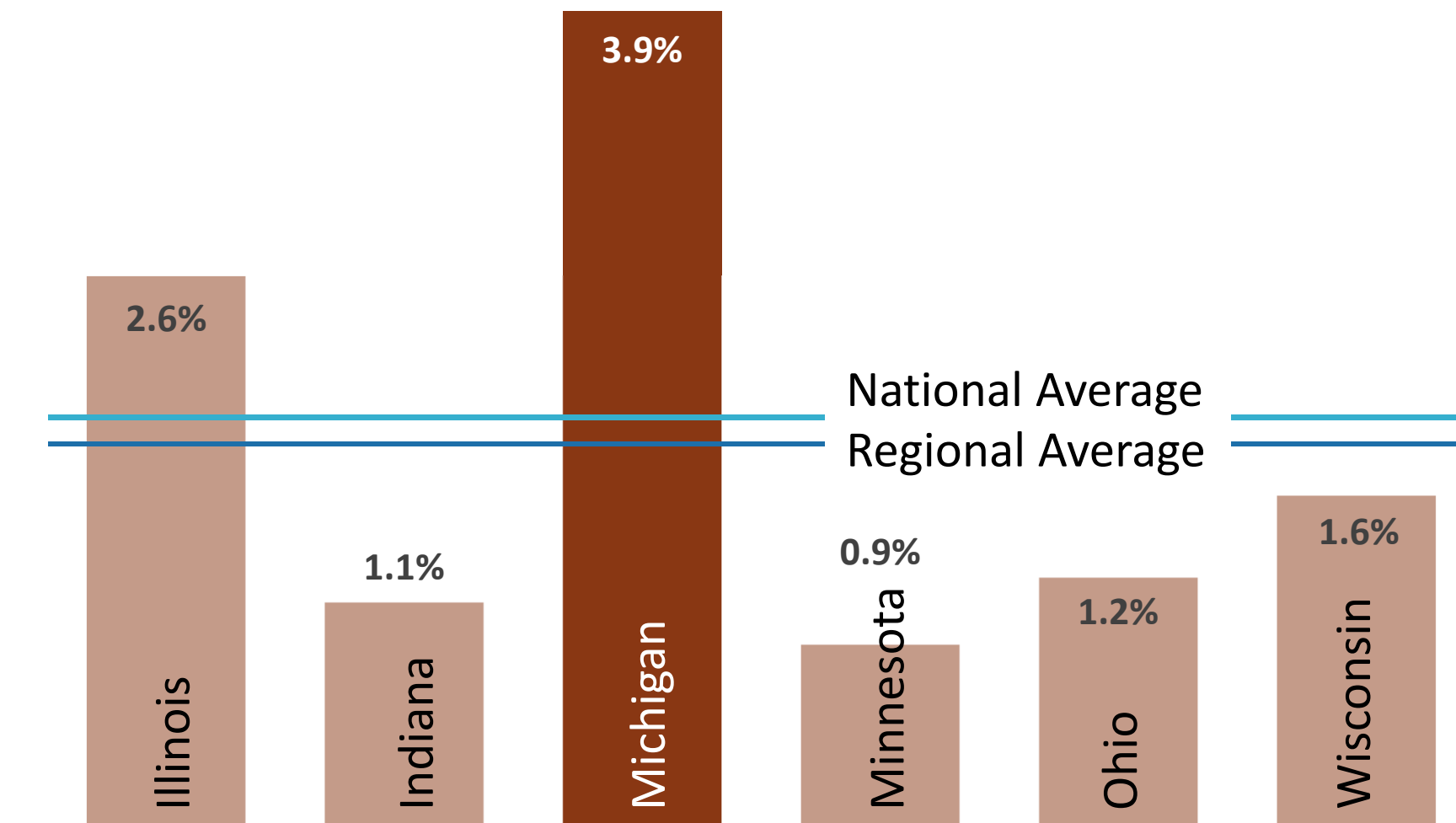
# Bridge Condition Comparison – Great Lakes



2018 Percent of Bridges in Poor Condition (NBI 4 or less)

# Bridge Condition Comparison – Great Lakes

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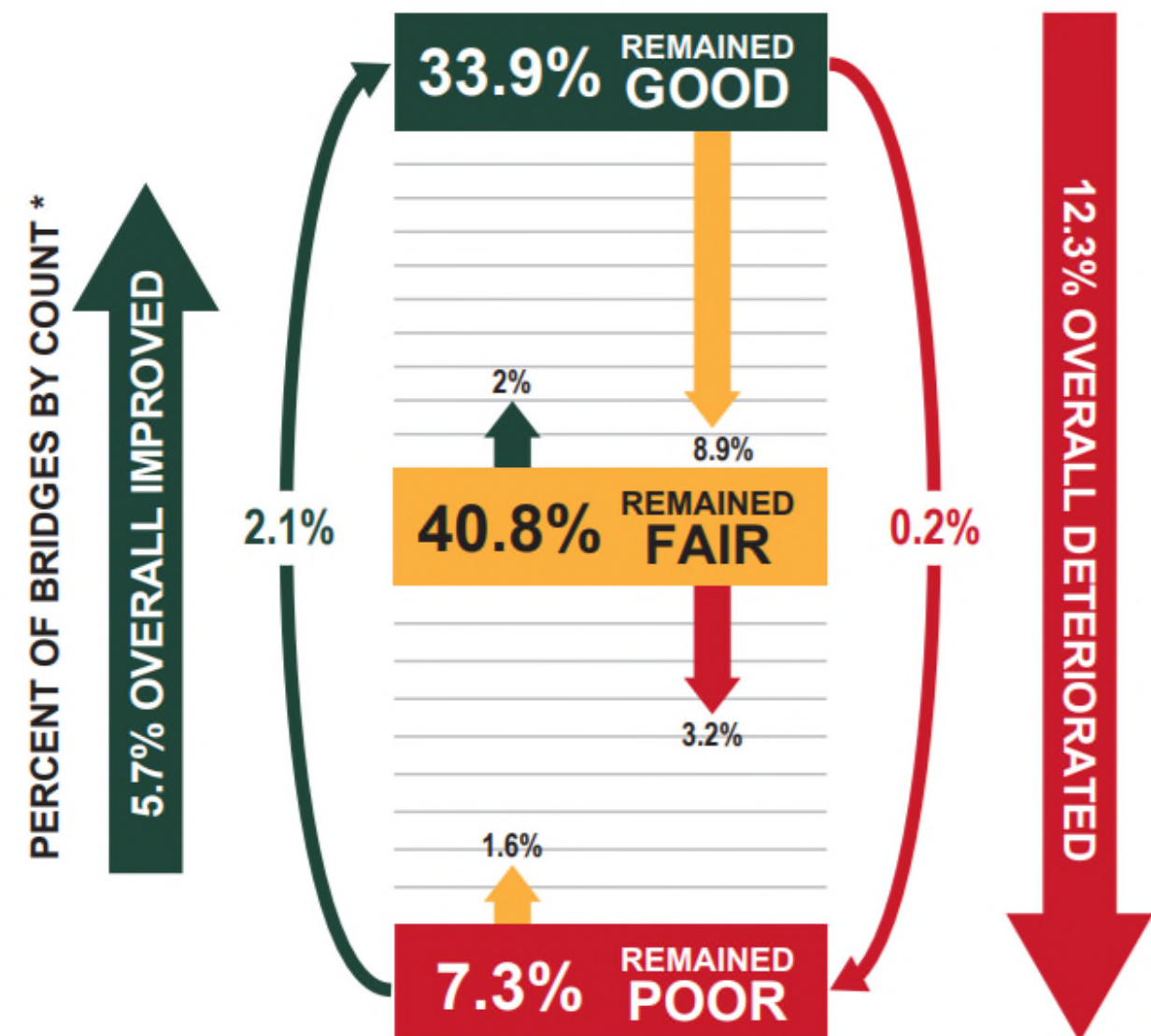
2018 Percent of Bridges in Severe Condition (NBI 3 or less)

# Bridge Condition – Statewide

**12.3%** of Michigan's bridges have **worsened** while only **5.7%** of the bridges were **improved**

## Michigan Bridges Cycle of Life

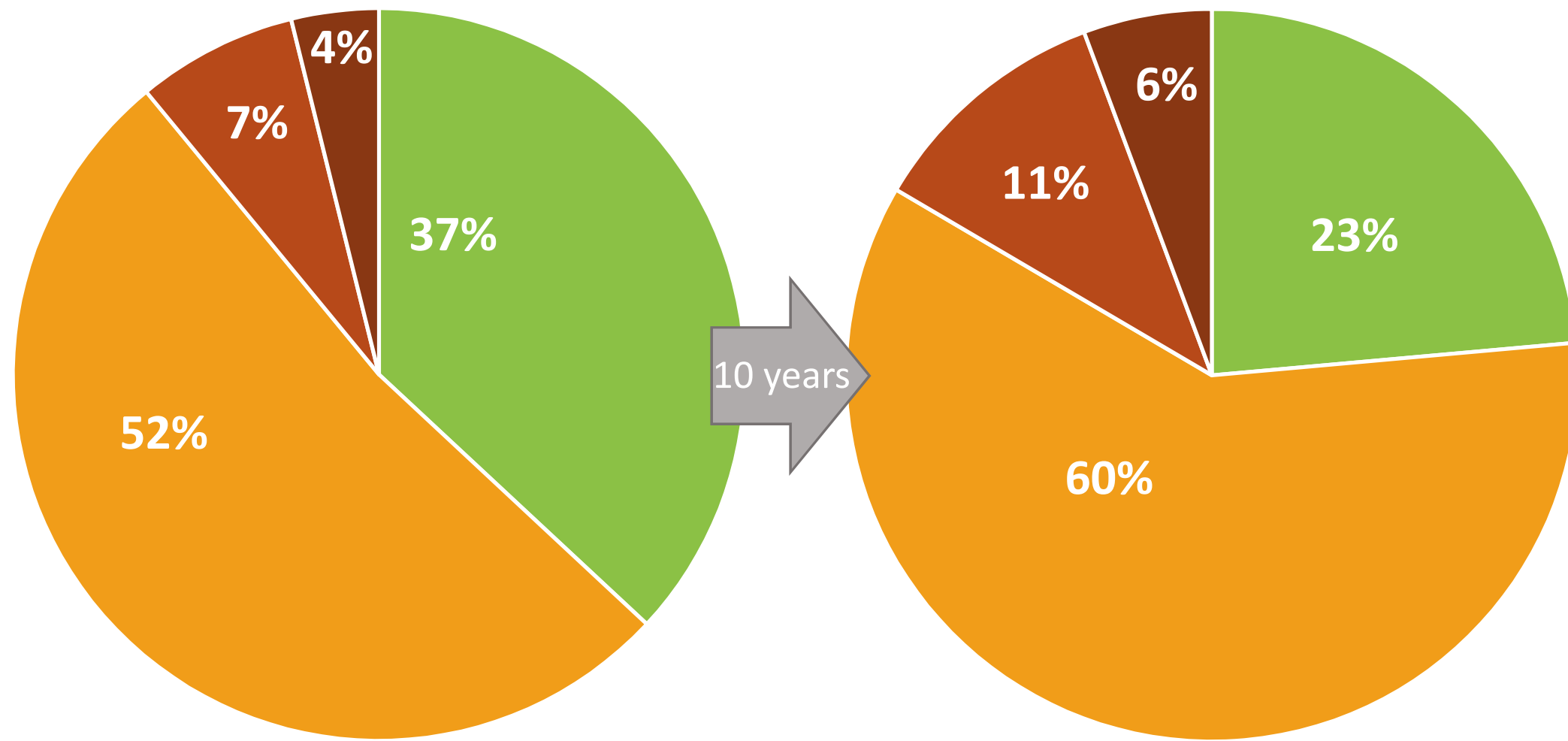
2015-2018



\* Does not include bridges added or removed in this time period



# Forecasting Condition – Current Funding



**2019** Statewide  
Measured Condition

**2029** Statewide  
Forecasted Condition

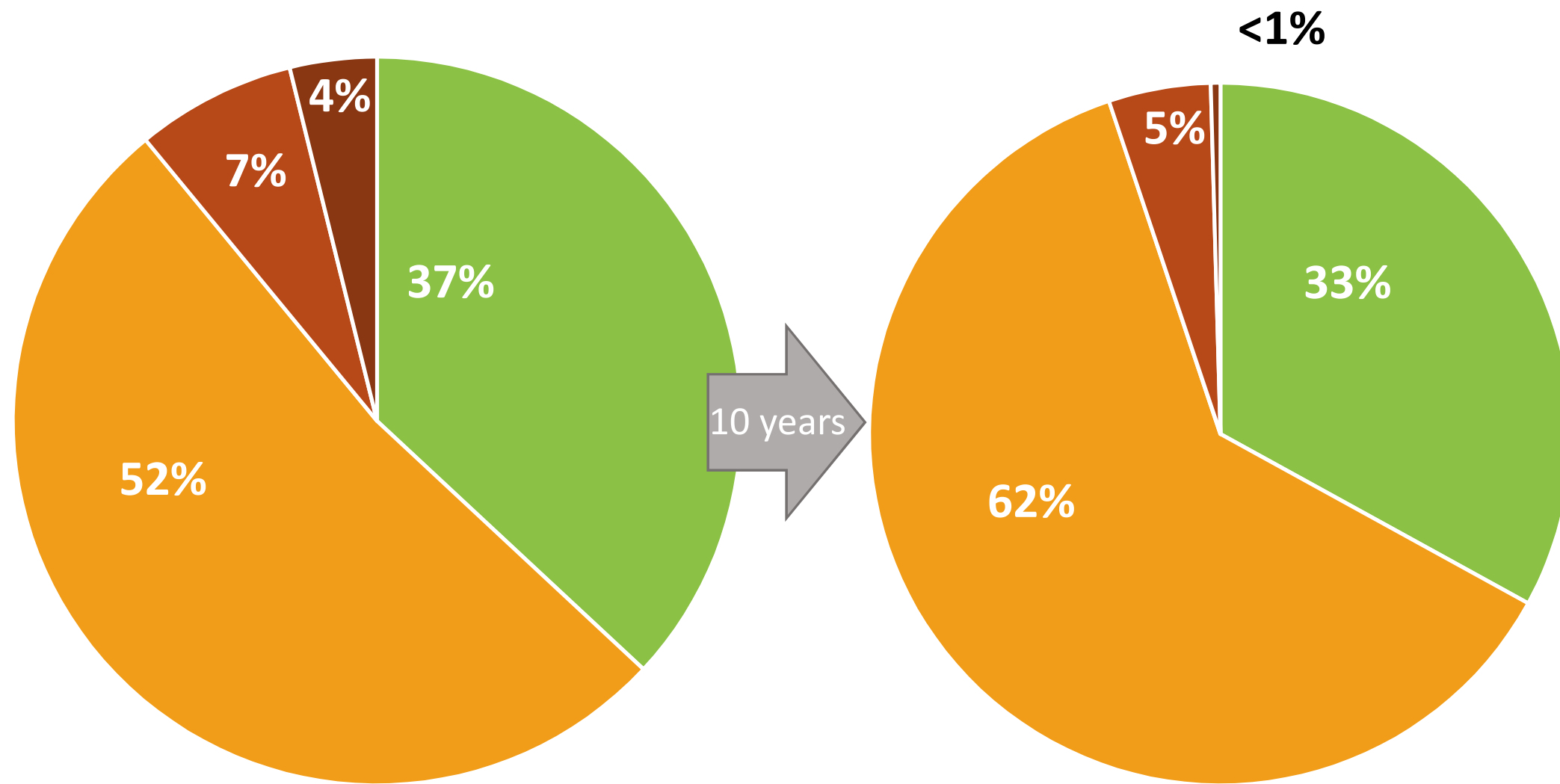
**Good Condition –**  
decreases 36%

**Fair Condition –**  
increases 15%

**Poor Condition –**  
increases 53%

**Severe Condition –**  
increases 47%

# Forecasting Condition – Proposed 95% Goal



**2019** Statewide Measured Condition

**2029** Statewide Forecasted Condition

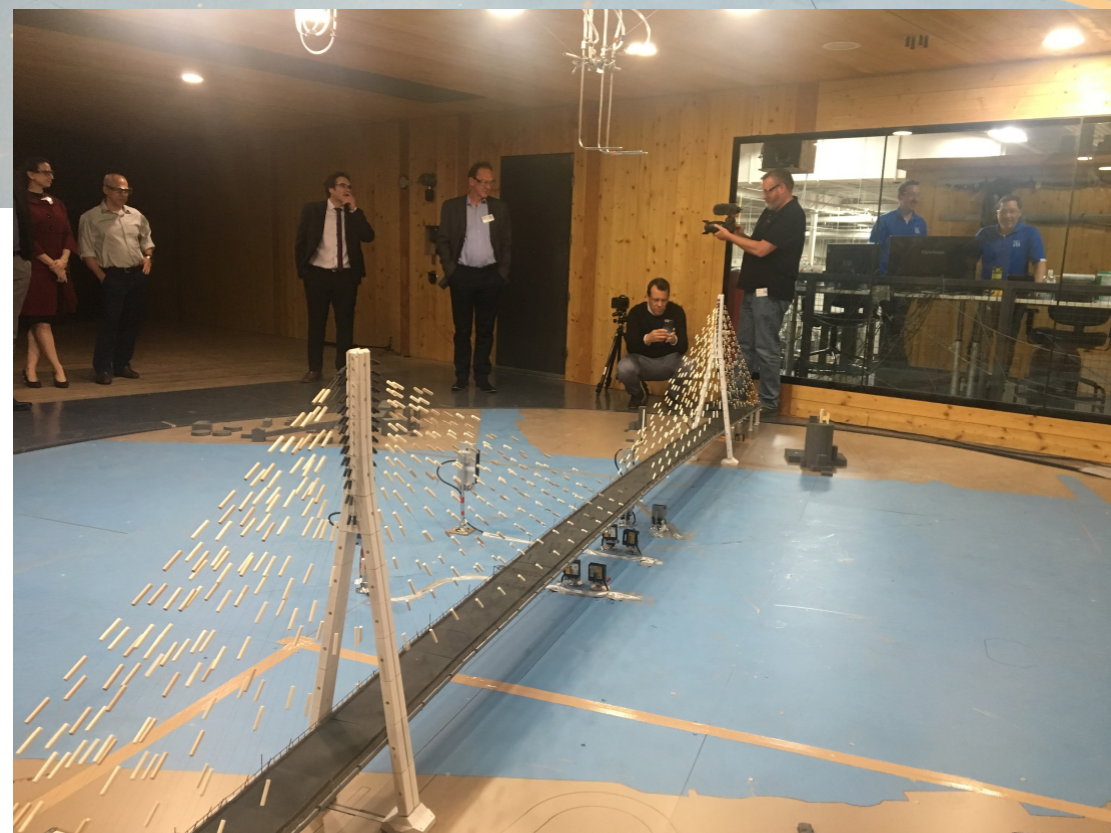
Additional Funding Needed Per Year:

\$125M – MDOT

\$110M – Local Agencies

\$58M – Local Agency Big Bridge

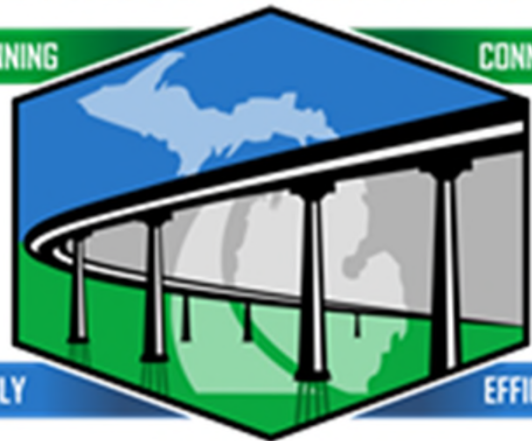




**BUREAU of BRIDGES**

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*Questions?*