MDOT Update

BUREAU of BRIDGES and STRUCTURES

SPANNING CONNECTING SAFELY EFFICIENTLY

Bridge Week 2021

March 16, 2021

Matthew J. Chynoweth, P.E. MDOT Chief Bridge Engineer

- OAG Bridge Inspection Program Audit Results
- Local Agency Bridge Bundling Pilot Project
- 3D Bridge Design Pilot Project
- Ancillary Structures Asset Management Effort
- Gordie Howe International Bridge Update
- FIU Bridge Collapse – NTSB recommendations - MDOT actions


NBIS Oversight Program
U.S. Department of Transportation
Federal Highway Administration
HIBS-30
NBIPOT
Metrics for the Oversight of the National Bridge Inspection Program
f the Auditor General
e Audit Report
Bridge Inspection Program and Michigan Bridge Management and Inspection System (MiBRIDGE)
Michigan Department of Transportation
January 2021

FHWA 23 Metrics Review

Currently Compliant or Conditionally Compliant for all 23 Metrics

- 2 Active Improvement Plans
- 1 Active Plan of Corrective Action
- National Tunnel Inspection Standards a new risk category

OAG Audit of Inspection Program and MiBRIDGE

3 Audit Objectives

- Administration of Inspection QAQC Program – **EFFECTIVE!!**
- Compliance with Federal and State Requirements – Complied
- MiBRIDGE Administration – Moderately Effective

Bridge Bundling

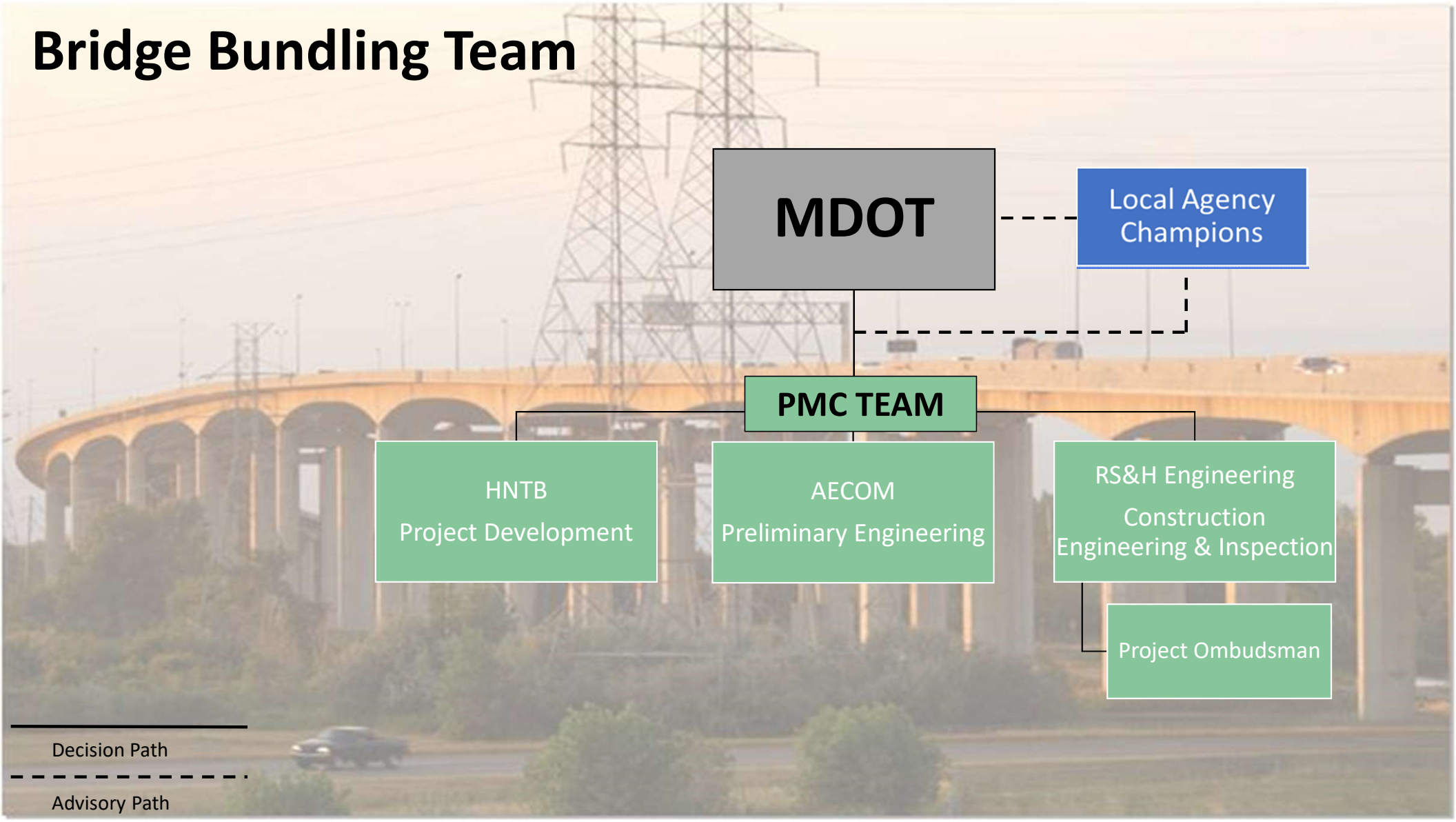
Local Bridges that

need some help!!!!!

Bridge Railing ??

Bridges of similar condition statewide in every County

Bridge Bundling Team



Pilot Bridge Bundling Package

RFQ June 2020

Shortlisting Proposers August 2020

RFP November 2020

One-on-one Meetings December 2020 January 2021

Tech Proposals & Low Bid February 2021

DB Contract Award March 2021

⇦ Summer 2020 to Early 2021

Contract Award March 2021

Meetings with Local Agencies

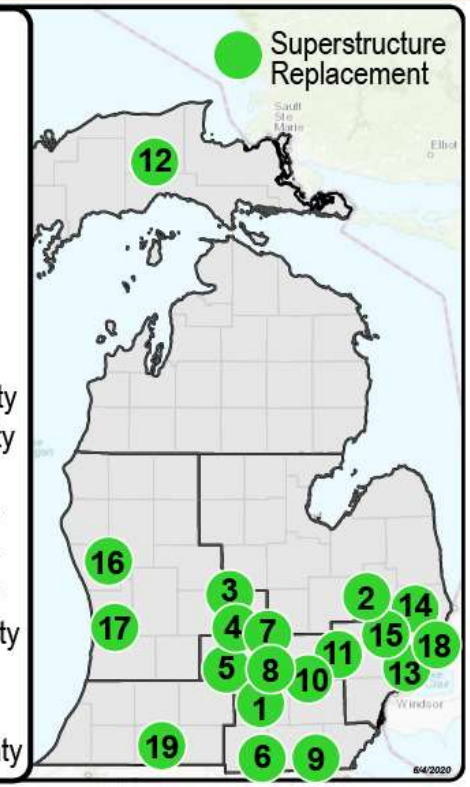
Final Design Work

Construction

Final Acceptance

⇦ Spring 2021 to Fall 2023

1. City of Jackson
2. City of Lapeer
3. Clinton County
4. Clinton County
5. Eaton County
6. Hillsdale County
7. Ingham County
8. Ingham County
9. Lenawee County
10. Livingston County
11. Livingston County
12. Luce County
13. Macomb County
14. Macomb County
15. Macomb County
16. Muskegon County
17. Ottawa County
18. St. Clair County
19. St. Joseph County



Open to Traffic

Pilot Bridge Bundling Procurement

- Official procurement start June 2020 with completion February 2021------8 months!
- 5 shortlisted teams; 2 teams dropped out; 3 teams submitted
- 2 one-on-one meetings held
- 183 questions asked, answered and posted
- 4 addenda issued
- 6 ATCs with the low bid accepted

Pilot Bridge Bundling

- Low bids received on February 19, 2021
- Bids were: $27.6, $25.2, with the low bid of $24.3 and within 2% of engineer's estimate
- Low bid team of CA Hull/Anlaan with Alfred Benesch
- Expected expedited award on March 5, 2021
- PMC CEI consultant team of RS&H Engineers selected in late January with contract award expected March/April for construction administration

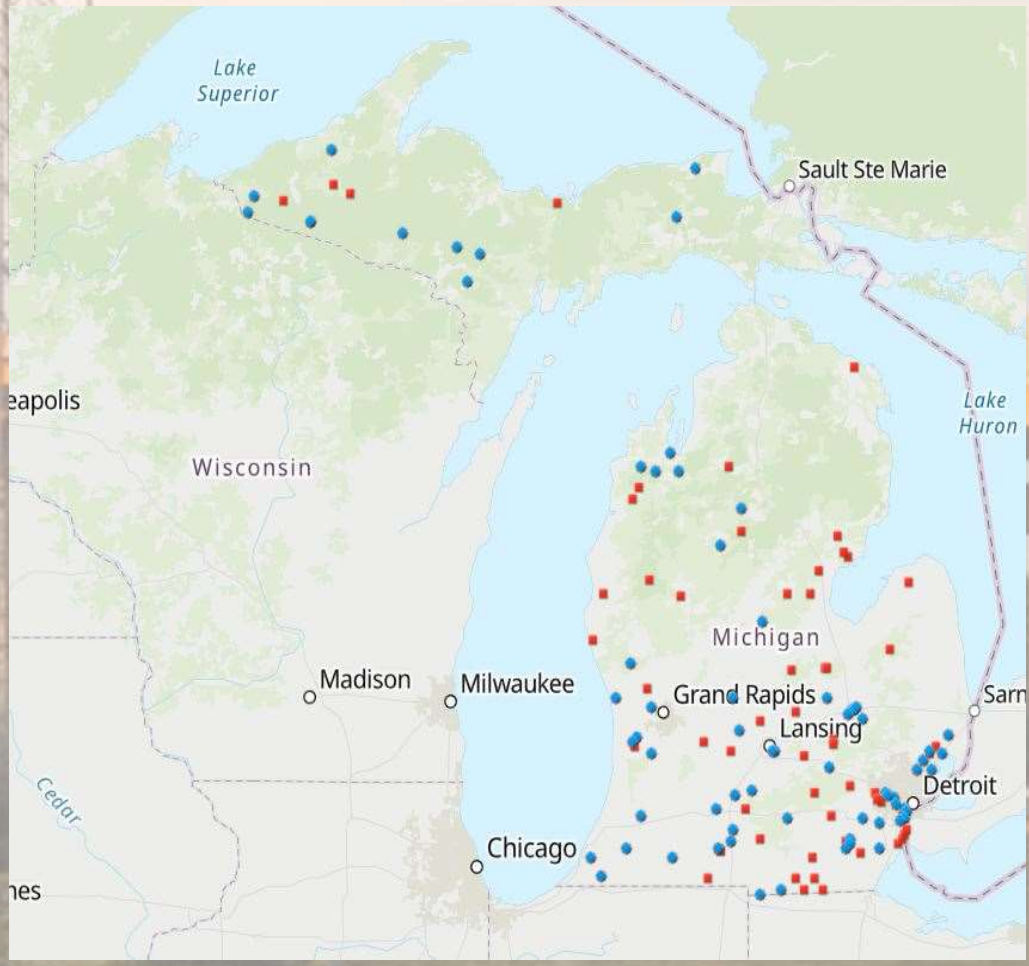
Future Bridge Bundling Governor's $300 Million Proposal

Focus on closed bridges (59) initially (red)

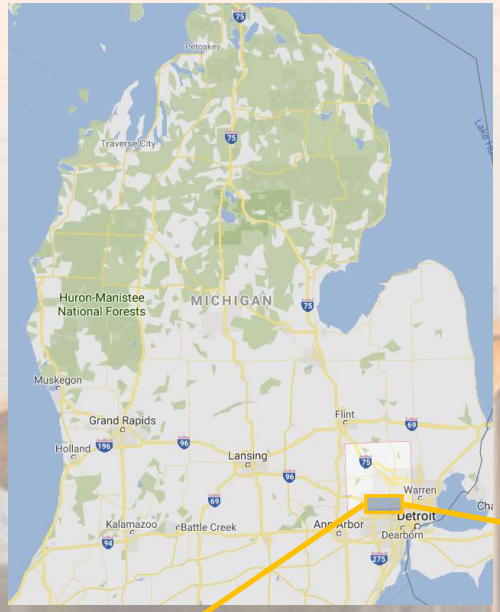
Procurement for Design-Build packages expected to start this Spring with construction to start 2022

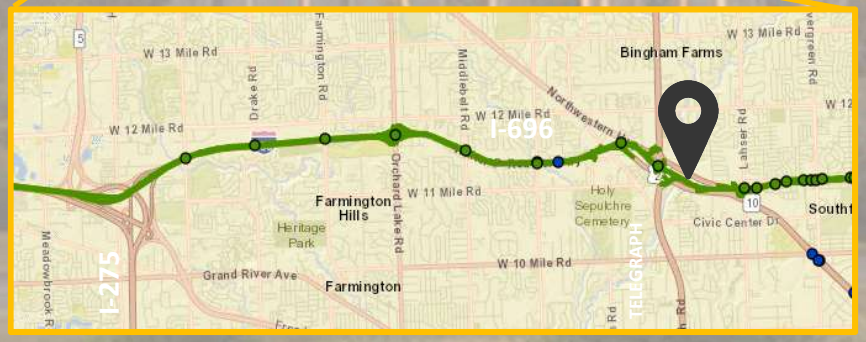
Next focus on serious/critical, load posted or high ADT bridges (60), dependent on funding approval (blue)

Procurement for Design-Build packages expected to start upon approvals



3D Bridge Model Delivery Pilot

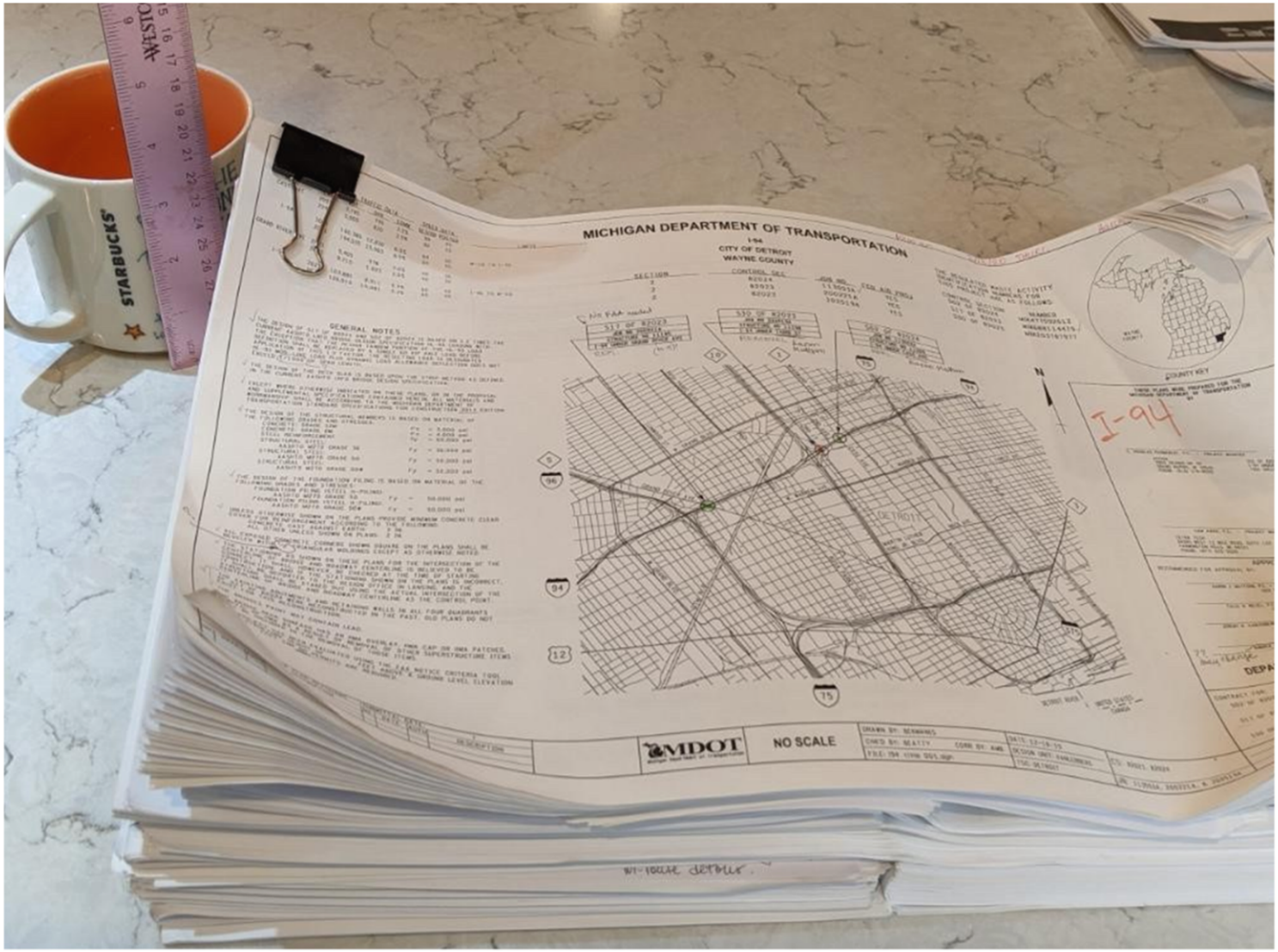




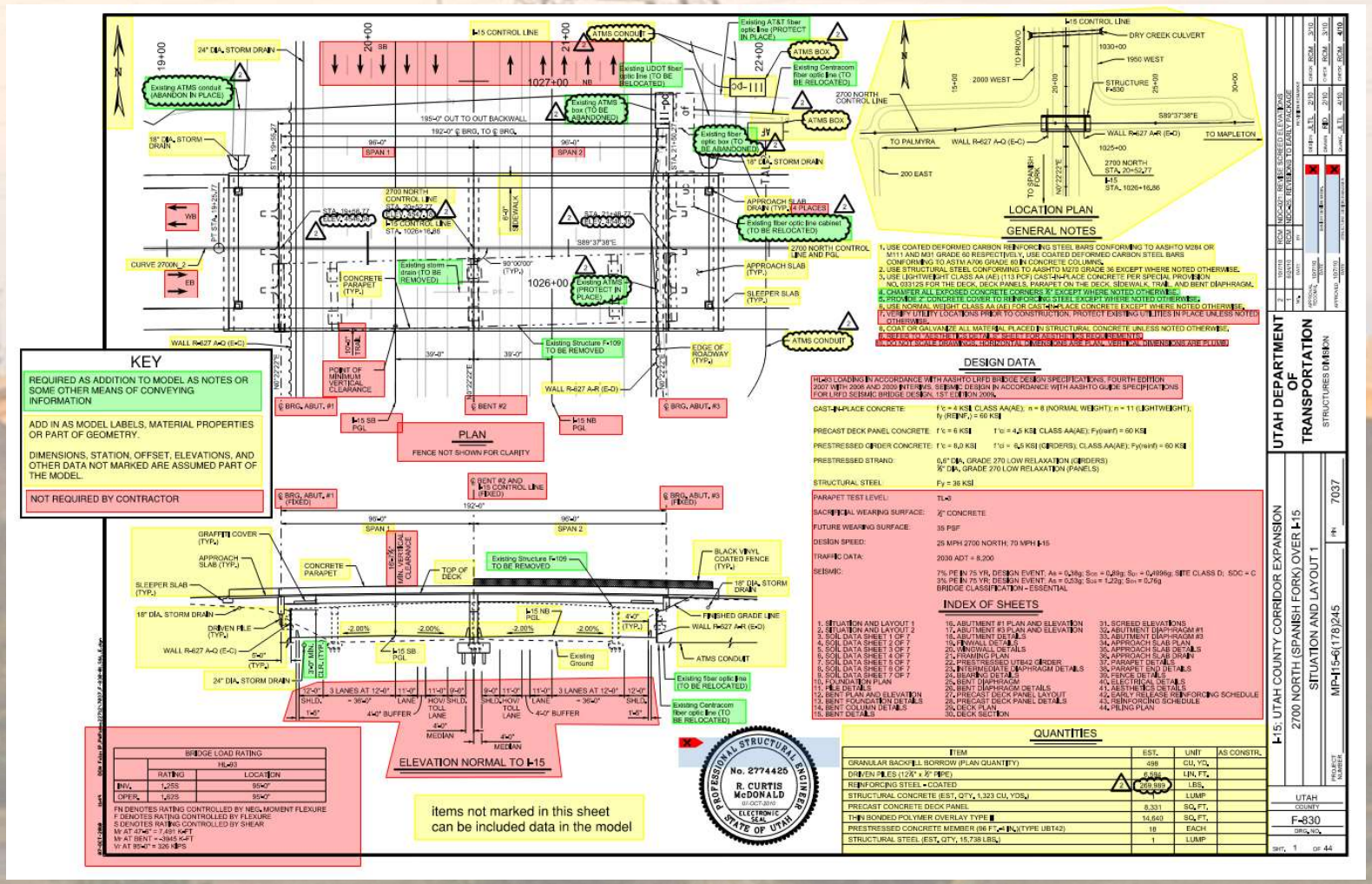
- I-696 EB & WB over Rouge River, Oak Park
- Structure Replacement
- I-696 Reconstruct - I-275 to Lahser
- November 2021 Letting

BIM FOR BRIDGES AND STRUCTURES
TPF-5(372)

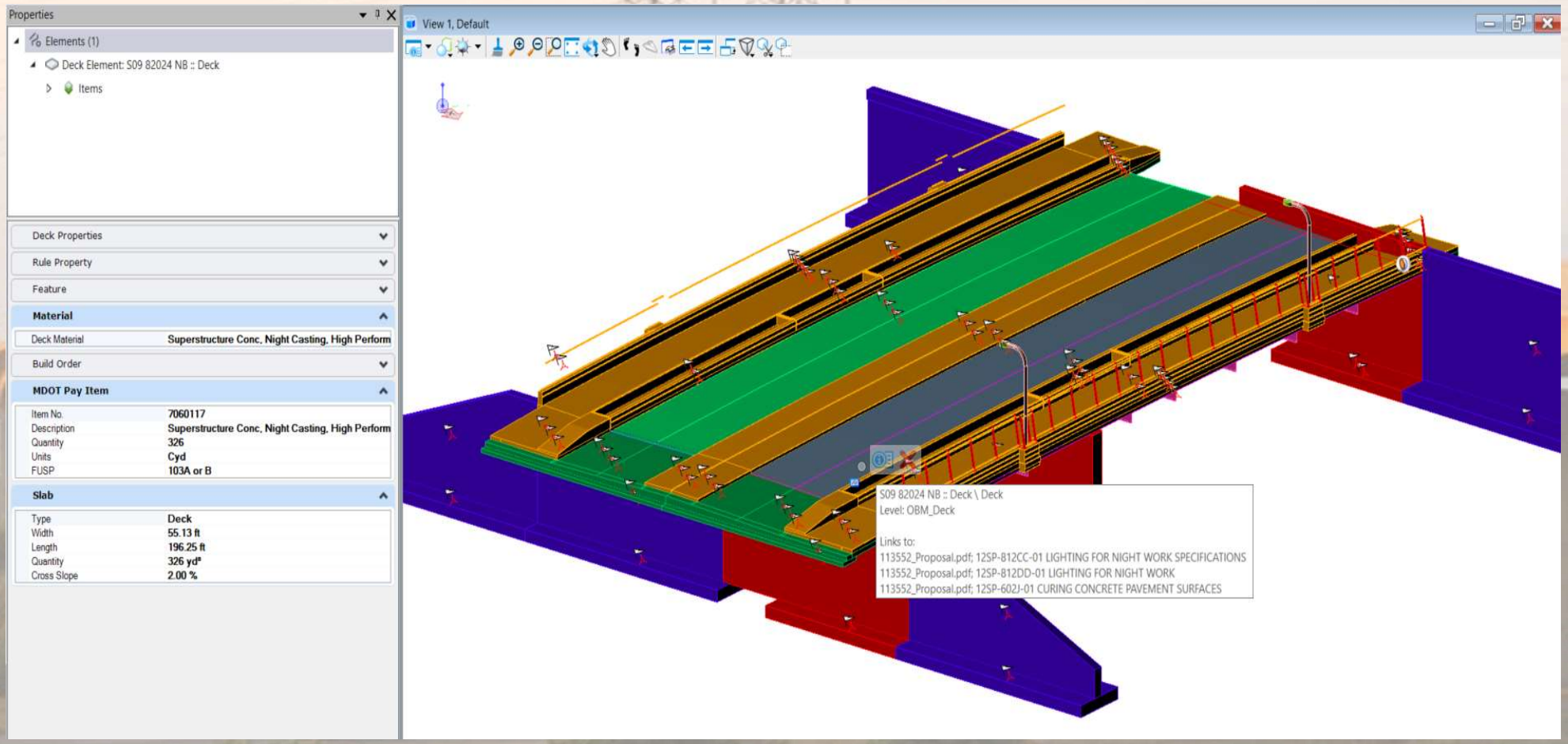

Existing Bridge


STARBUCKS
MICHIGAN DEPARTMENT OF TRANSPORTATION
I-94
CITY OF DETROIT
WAYNE COUNTY
GENERAL NOTES
I-94
MDOT
NO SCALE

Essential Details

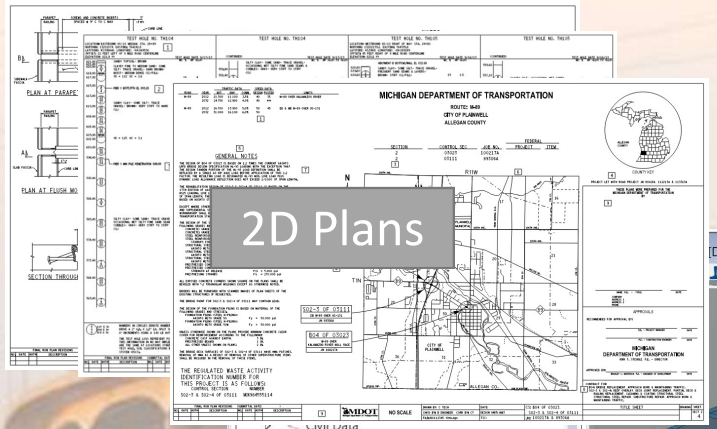


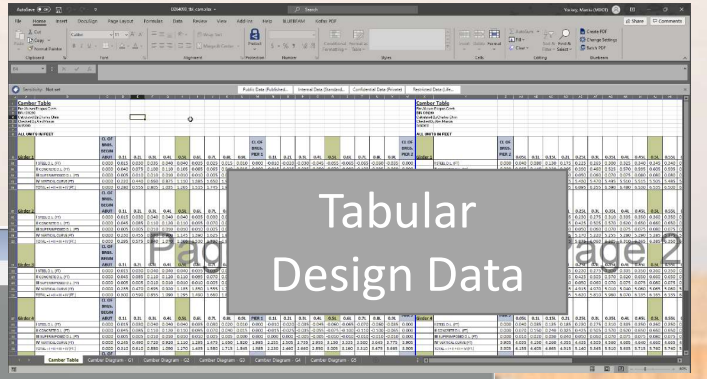
Information Model

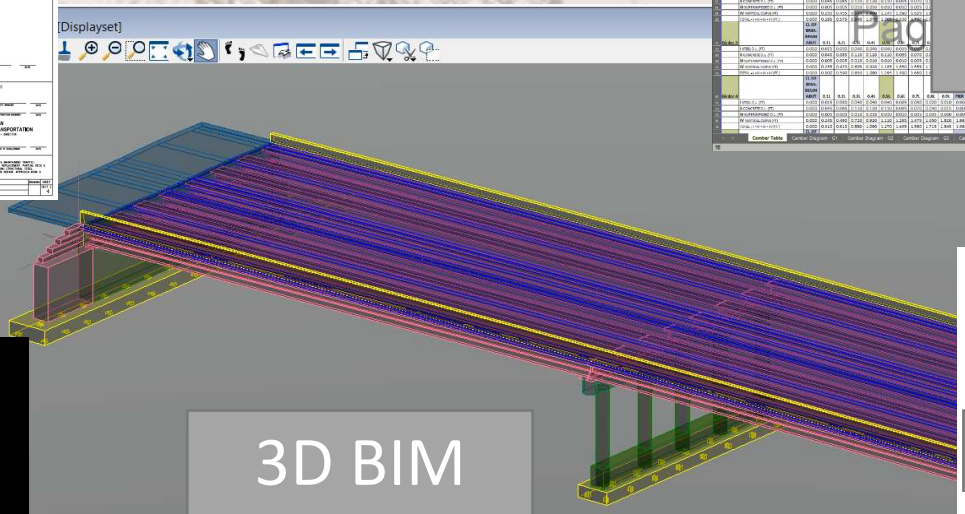


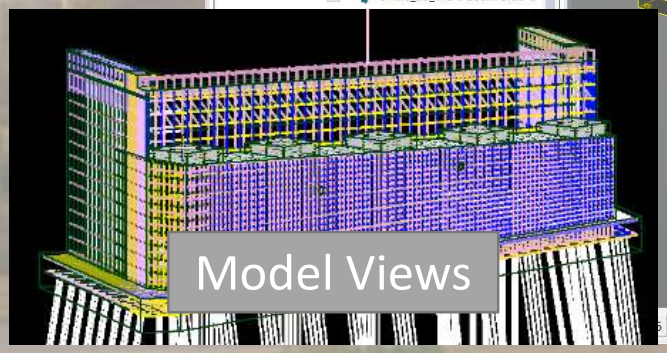
Attribution

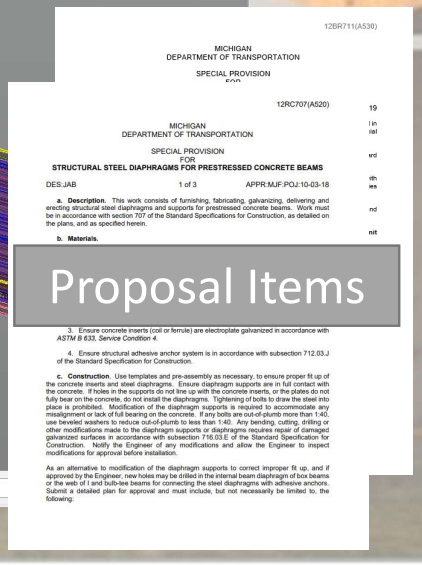
3D Bridge Model Delivery Pilot











Ancillary Structures Program

Ancillary Structure Region Inventory (2/25/20)									
		Region							
Structure	Qty	Sup	North	Grand	Bay	Swest	Univ	Metro	Total
Cantilevers	Each	9	3	111	89	117	163	426	918
Sign Trusses	Each	11	1	130	100	60	161	369	832
Light Towers	Each	13	0	75	20	4	45	*	157
Frangible Lights	Each	0	0	99	438	0	223	*	760
Non - Frangible Lights	Each	13	0	330	487	0	116	*	946
Mast Arms	Each	0	10	6	4	10	13	54	97
Dynamic Message Signs (DMS)	Each	2	4	31	18	20	24	94	193
Spun Concrete Poles	Each	0	4	17	50	35	58	133	297
Communication Towers	Each	0	0	0	8	0	1	14	23
Environmental Sensor Station (ESS)	Each	39	20	3	30	9	0	1	102
Retaining Walls	Lft	1,200	901	24,286	8,359	3,561	5,411	236,069	279,787
Sound Walls	Lft	0	0	24,802	23,190	36,900	41,804	222,215	348,911
Culverts under 10'	Each	5,297	5,988	5,683	5,870	7,741	4,597	1,693	36,869
Embedded Poles	Each	18	6	14	7	20	19	5	89
Steel Strain Poles	Each	1	10	39	12	6	6	312	386
Wood Poles (ITS)	Each	9	5	100	45	39	33	70	301

Success workshops identified program goals – Greater Levels of Integration

	BASELINE	BOLD	BOLDER	BOLDEST
Definition	Ancillary Structures (AS) are siloed in separate records with limited, separate processes and procedures. Management of AS is reactionary to address issues as they are discovered.	Uniform database structure and asset attributes, inspection processes and rating schemes established. RFA process developed and facilitated through existing communication tools.	Integration of AS lifecycle and conditions data to inform transportation asset corridor Planning, Capital programming (4R, 3R, etc.), Construction and O&M.	Comprehensive AS Asset Management Program aligned with AASHTOWare BrM Pavement and other MDOT transportation programs.
Benefits	Number of assets and locations are available. Some staff can make capital investment decisions using asset data. Development and Delivery staff include AS work in projects when necessary.	Single source of truth for all AS types, easier access to data and consistent rating schemes to measure and compare condition of assets. Improved risk management.	Integrated processes across business systems so asset conditions can inform maintenance and capital needs supporting lifecycle replacement. Further reduced risk.	Proactive asset management of all AS types resulting in safe conditions, managed risk, cost savings, and program funding support
Impact on Resources	Majority of maintenance staffs time is spent reacting to inspect/address individual AS issues; difficult to assess individual and overall condition of AS.	Reduced workloads from access and utilization of complete data sets as well as established program roles through the PMC and Region Champions.	Efficient staff effort to incorporate AS asset replacement or repair considerations as part of all transportation related projects	Programmatic approach created to provide consistent, predictable plan for Lifecycle resource management of AS.
System Performance	System performance metrics established for maintenance, but no performance measures. The system is largely managed on a reactive basis.	Establish performance metrics that relate to age and condition of assets.	Refined performance metrics and measures that incorporate maintenance and repair history with the age and asset conditions.	Dynamic performance metrics/measures that are integrated with funding support for maintenance and capital programs.

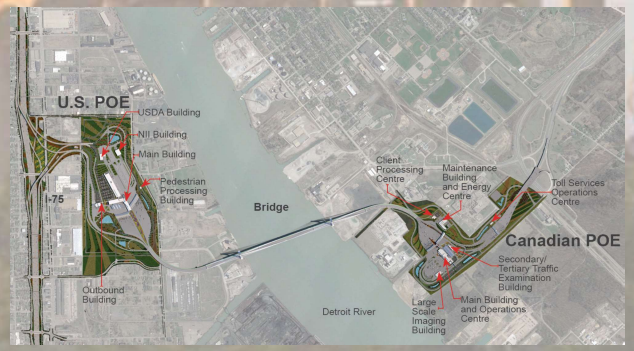
Success workshops identified program goals – Greater Levels of Continuous Improvement

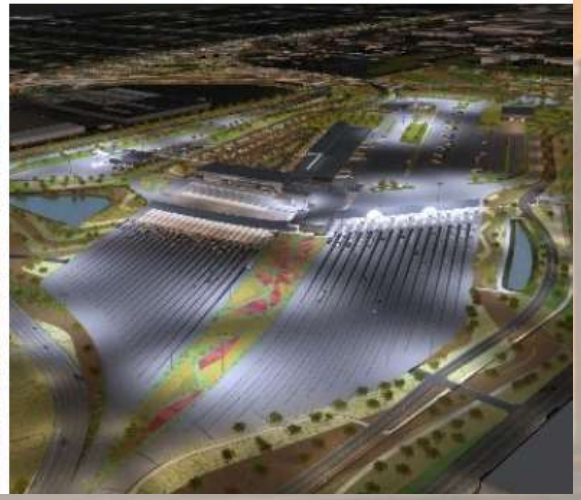
	BASELINE	BOLD	BOLDER	BOLDEST
Definition	Maintenance actions (repair, replacement) are reactionary	Assets within upcoming project limits are flagged at project programming for PM to coordinate	System forecasts needs based on asset age, condition, excluding confirmed project replacements	National model for other DOT's as a "best practice" for system definition, management, and adoption
Benefits	Varying results from data-driven maintenance planning activities and costs	Consistent definition across Regions for condition, required action, and exception policies	Clear understanding and consistent support by MDOT leadership with increased funds to maintenance	Public access to asset condition information with opportunity to influence funding allocation
Impact on Resources	Additional time, cost, resources needed to resolve missing or incorrect asset data	Enhancement or supplement to current functions to improve data collection and accuracy	Dedicated resource by Region, TSC to coordinate, with dedicated MDOT enterprise resource	Transfer coordination, maintenance risk to third-party vendor (incentive?)
System Performance	Inconsistent quality of asset location and condition ratings information.	Completion of all accurate asset type location and condition ratings.	Single platform with full access across multiple MDOT functions	"Smart" assets notify MDOT if they are near end of service life or damaged

Near Term Goals

- By Spring 2021, Develop RFA process for Priority Ancillary Structures
- By end of 2021, Ensure Ancillary Structure Designs meet updated AASHTO LRFD standards
- By Spring 2021, Develop inventory collection and condition ratings for Priority Ancillary Structures
- By Spring 2021, Commence field inventory and condition inspection of Priority Ancillary Structures
- By Spring 2021, Develop initial performance metrics for Priority Ancillary Structures

Project Components





Canadian Bridge Site

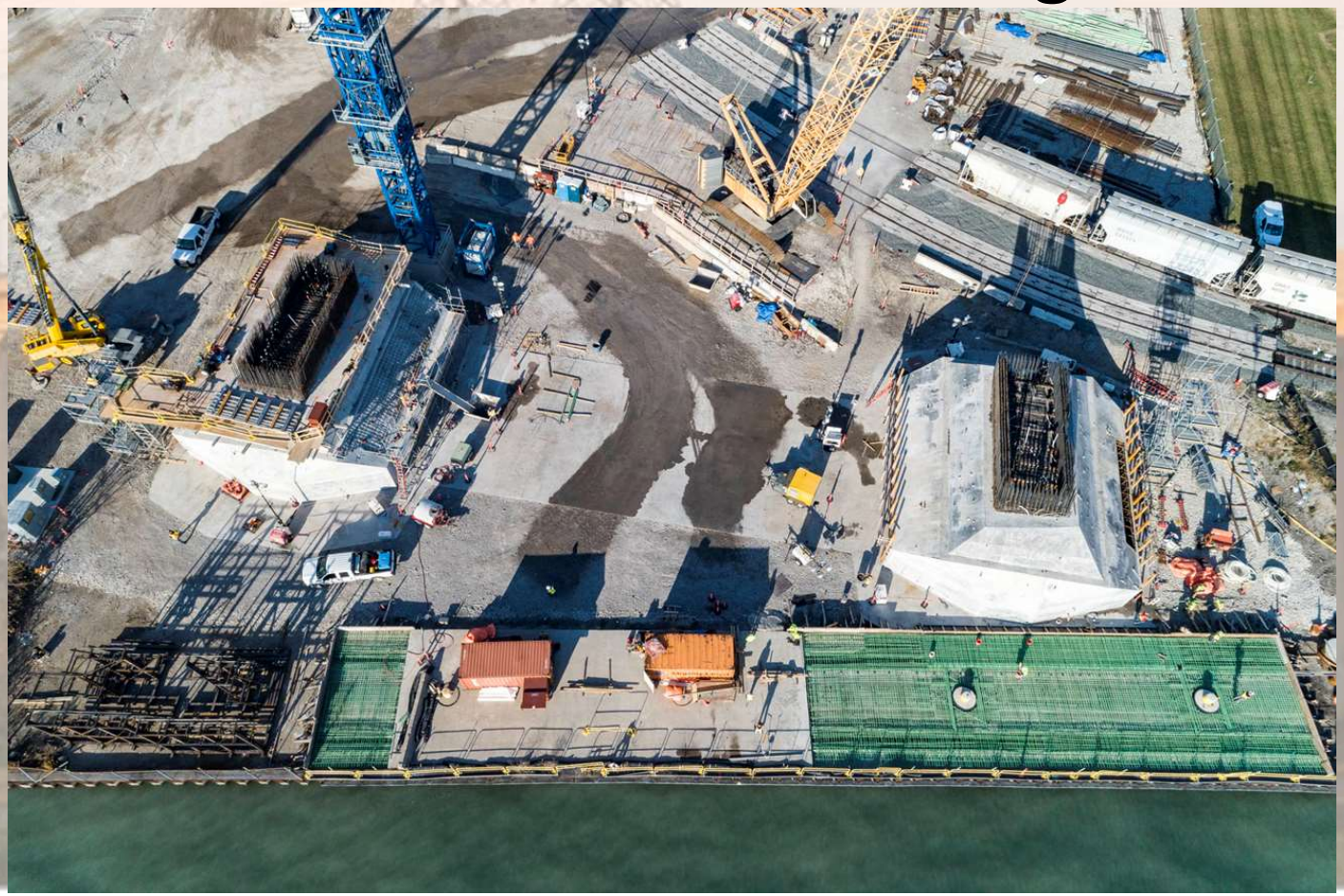
BRIDGE TOWER ARTWORK: CANADA

U.S. Bridge Site

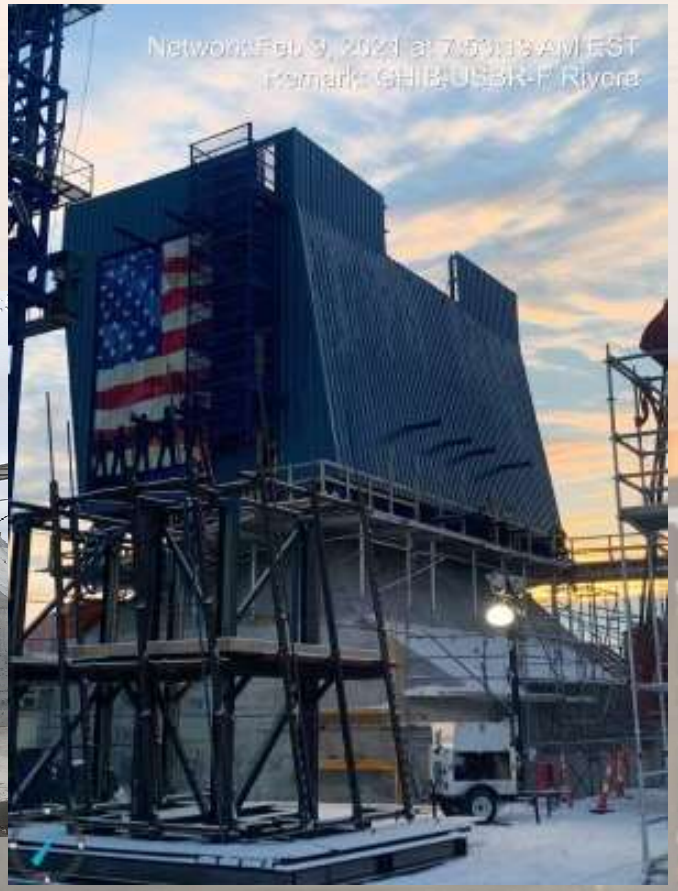
U.S. Bridge Site

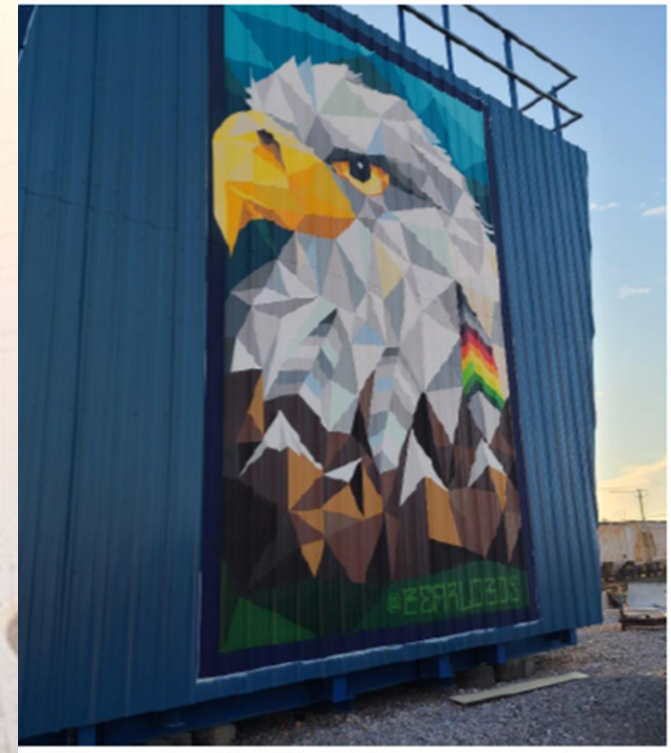
U.S. Bridge Site

U.S. Bridge Site



U.S. Bridge Site

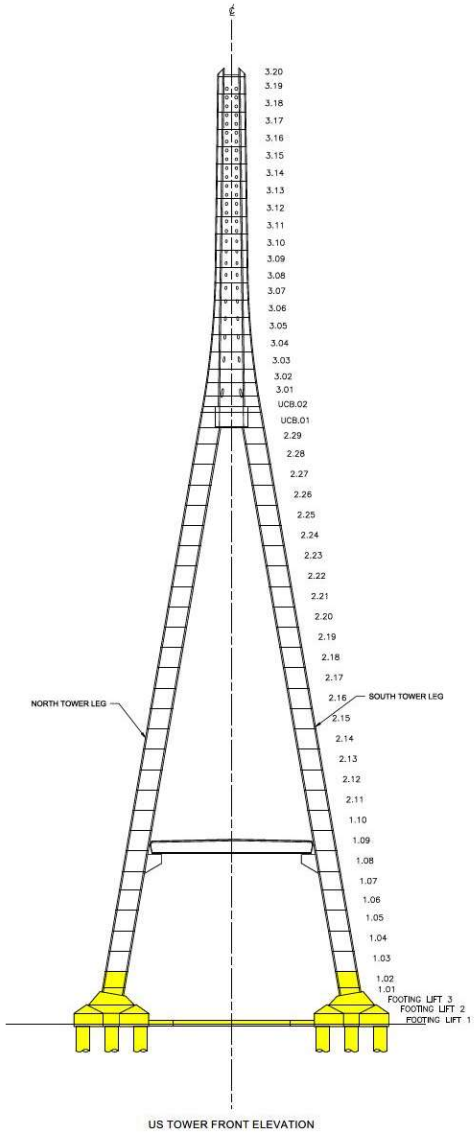




BRIDGE TOWER ARTWORK: US

U.S. Bridge Site

Much has been done, but we have a long way to go…



FIU Bridge Collapse NTSB Actions Implemented by MDOT

NTSB Recommendations for Bridge Community:

Ensure qualified independent design reviews for complex bridges

Create alignment in understanding of bridge owner responsibility and authority to close bridge, or traffic below when structural issues are discovered

Ensure bridge community understands all standards and provide additional oversight on complex bridges

Add discussions and emphasis on redundancy to all structures manuals and design guidelines

MDOT Actions

MDOT Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: July 1, 2020

TO: Region Engineers
Region Construction
Region Bridge Engineers

FROM: Matthew J. Chynoweth, P.E.
Bureau of Bridges and Structures
Chief Bridge Engineer

Rebecca Curtis, P.E.
Bureau of Bridges and Structures
Deputy Chief Bridge Engineer

SUBJECT: Authority for Bridge Closures

This memo serves to establish the technical basis for the closure of bridges to traffic, or the closure of roadways below bridges to traffic. In general, the provisions below cover all bridges in Michigan, whether in-service, closed, or under construction.

Information regarding responsibilities and procedures for bridge closures during the National Bridge Inspection Standards (NBIS) inspection process, scour determinations, or other operational aspects of in-service bridges can be found in the Michigan Department of Transportation (MDOT) Structure Inspection Manual (MiSIM), Chapter 10.

Bridge construction activities are often complex, requiring specific erection procedures and analyses for complex bridges, and careful thought on element erection, material and equipment placement, and sequencing of work activities.

As part of the National Transportation Safety Board (NTSB) investigation and final report of the Florida International University Pedestrian Bridge Collapse (NTSB HR1902), the NTSB made several recommendations to bridge owner agencies, one of which as outlined below:

- TO THE FLORIDA DEPARTMENT OF TRANSPORTATION: Revise local agency program agreements to specify that when structural cracks are initially detected during bridge construction, the engineer of record, construction engineering inspector, design–build firm, or local agency that owns or is responsible for the bridge construction must immediately close the bridge to construction personnel and close the road underneath; fully support the entire bridge weight using construction techniques that do not require placing workers on or directly under the bridge during installation; and restrict all pedestrian, vehicular, and construction traffic on the bridge until the complete support is in place and inspected.

Matthew J. Chynoweth, P.E. Matthew J. Chynoweth Jun 24 2020 9:07 AM

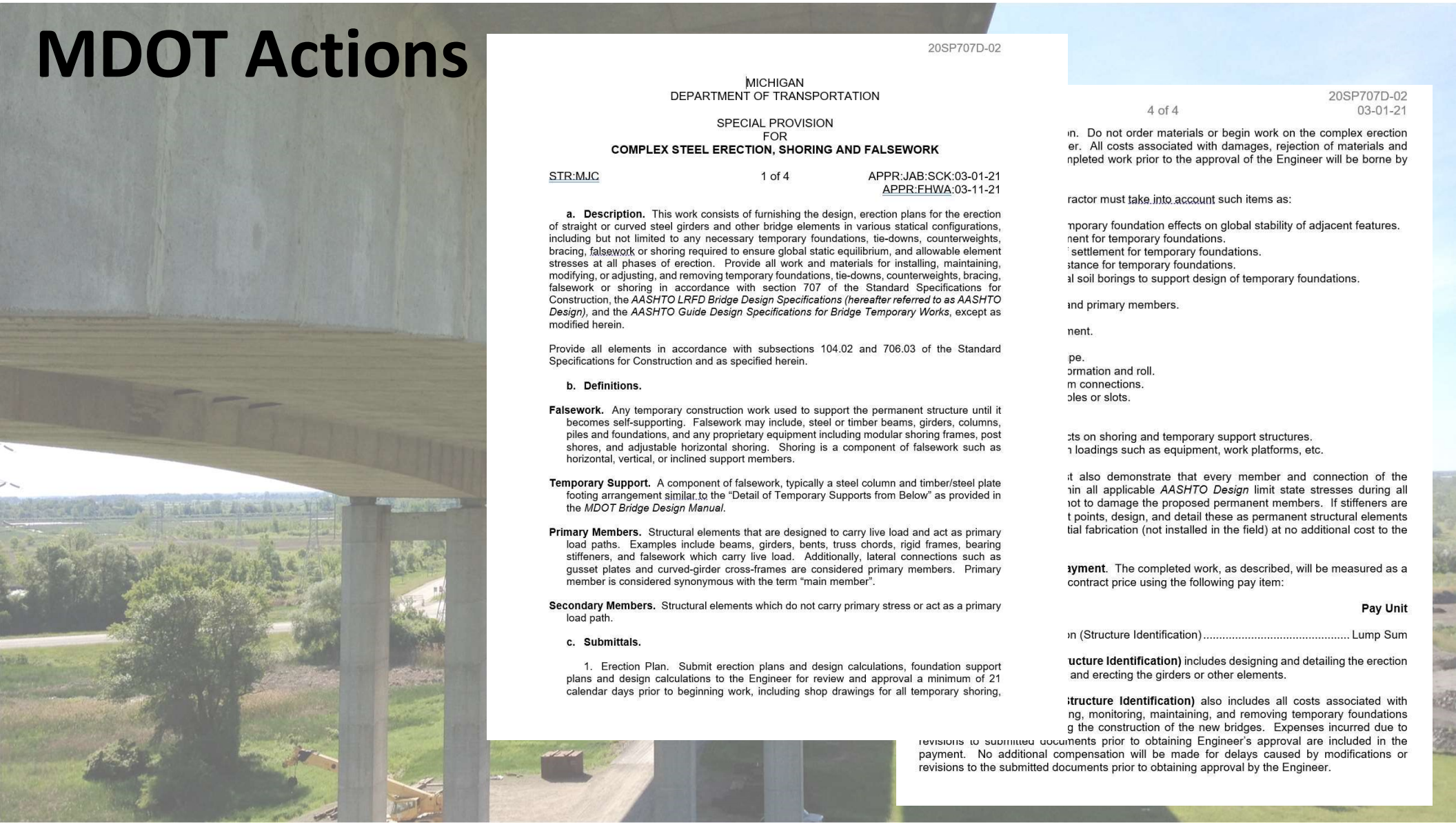
Matthew J. Chynoweth, P.E.
Bureau of Bridges and Structures
Chief Bridge Engineer

Rebecca Curtis, P.E. Rebecca Curtis Jun 24 2020 10:04 AM

Rebecca Curtis, P.E.
Bureau of Bridges and Structures
Deputy Chief Bridge Engineer

cc: Tony Kratofil, Chief Operations Officer
Brad Wieferich, Director, Bureau of Development
Gregg Brunner, Director, Bureau of Field Services

MDOT Actions



MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
COMPLEX STEEL ERECTION, SHORING AND FALSEWORK

STR:MJC 1 of 4 APPR:JAB:SCK:03-01-21
APPR:FHWA:03-11-21

a. Description. This work consists of furnishing the design, erection plans for the erection of straight or curved steel girders and other bridge elements in various statical configurations, including but not limited to any necessary temporary foundations, tie-downs, counterweights, bracing, falsework or shoring required to ensure global static equilibrium, and allowable element stresses at all phases of erection. Provide all work and materials for installing, maintaining, modifying, or adjusting, and removing temporary foundations, tie-downs, counterweights, bracing, falsework or shoring in accordance with section 707 of the Standard Specifications for Construction, the *AASHTO LRFD Bridge Design Specifications (hereafter referred to as AASHTO Design),* and the *AASHTO Guide Design Specifications for Bridge Temporary Works*, except as modified herein.

Provide all elements in accordance with subsections 104.02 and 706.03 of the Standard Specifications for Construction and as specified herein.

b. Definitions.

Falsework. Any temporary construction work used to support the permanent structure until it becomes self-supporting. Falsework may include, steel or timber beams, girders, columns, piles and foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring. Shoring is a component of falsework such as horizontal, vertical, or inclined support members.

Temporary Support. A component of falsework, typically a steel column and timber/steel plate footing arrangement similar to the "Detail of Temporary Supports from Below" as provided in the *MDOT Bridge Design Manual*.

Primary Members. Structural elements that are designed to carry live load and act as primary load paths. Examples include beams, girders, bents, truss chords, rigid frames, bearing stiffeners, and falsework which carry live load. Additionally, lateral connections such as gusset plates and curved-girder cross-frames are considered primary members. Primary member is considered synonymous with the term "main member".

Secondary Members. Structural elements which do not carry primary stress or act as a primary load path.

c. Submittals.

1. Erection Plan. Submit erection plans and design calculations, foundation support plans and design calculations to the Engineer for review and approval a minimum of 21 calendar days prior to beginning work, including shop drawings for all temporary shoring,

ın. Do not order materials or begin work on the complex erection
er. All costs associated with damages, rejection of materials and
npleted work prior to the approval of the Engineer will be borne by

ractor must take into account such items as:

mporary foundation effects on global stability of adjacent features.
nent for temporary foundations.
settlement for temporary foundations.
stance for temporary foundations.
al soil borings to support design of temporary foundations.

and primary members.

nent.

pe.
ormation and roll.
m connections.
oles or slots.

cts on shoring and temporary support structures.
n loadings such as equipment, work platforms, etc.

it also demonstrate that every member and connection of the
nin all applicable *AASHTO Design* limit state stresses during all
ıot to damage the proposed permanent members. If stiffeners are
t points, design, and detail these as permanent structural elements
tial fabrication (not installed in the field) at no additional cost to the

ayment. The completed work, as described, will be measured as a
contract price using the following pay item:

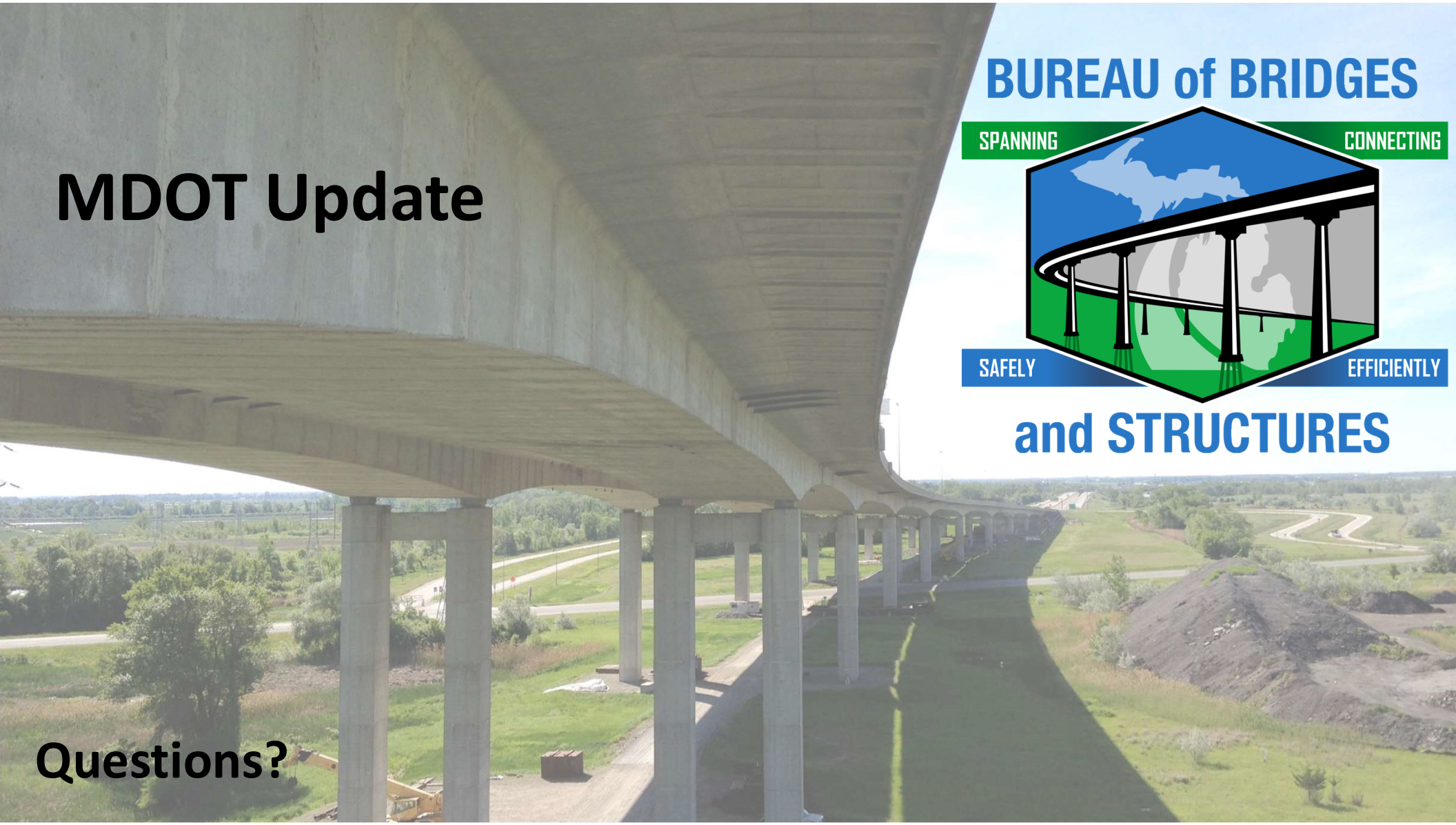
Pay Unit

ın (Structure Identification) ..... Lump Sum

ucture Identification) includes designing and detailing the erection
and erecting the girders or other elements.

structure Identification) also includes all costs associated with
ng, monitoring, maintaining, and removing temporary foundations
g the construction of the new bridges. Expenses incurred due to
revisions to submitted documents prior to obtaining Engineer's approval are included in the payment. No additional compensation will be made for delays caused by modifications or revisions to the submitted documents prior to obtaining approval by the Engineer.

MDOT Update



Questions?