BUREAU OF STRUCTURES

2025 Structure Inspection Refresher Training

Webinar

March 19, 2025

N Agenda:

- Inspection Program
- HSIS Update
- Types of Inspections and Activities
- Inspection Elements, SNBI/New Items
- Condition Ratings, Reminders and Reports
- SNBI Railings
- QA Review Findings
- Steel Section Loss
- ArcGIS Web Map
- Q&A

Slide Status – top left corner

N = New topic

R = Reminder/review of existing topic

U = Updated topic

R Inspection Program Management (SIM 1.2.5.7)

- Advanced planning is necessary to avoid inspections being completed past the due date.
- Inspections are expected to be done by the due date shown in the Monthly Scheduling Report.
- PMs - review the monthly scheduling reports
  - Review in advance to identify potential conflicts with inspections.
  - Communicate with the appropriate Team Leader (TL) or local PM on **Past-due** or **Missing** inspections that are shown under the 'STATUS' column in the Monthly Scheduling Report.

MONTHLY SCHEDULING REPORT from HSIS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	STRUCTURE_ID	FEATURE_ON	FEATURE_UNDER	REGION	COUNTY	MUNICIPALITY	OWNER	TYPE	FREQUENCY	PRIOR_DATE	ACE_DA	DUE	STATUS	MONTHS
2	B020026	STH 169	BAD RIVER	NW	ASHLANI	T-MORSE(02018	STATE HIGI	ROUTINE	12	2023-10-17		2024-10-31	DUE	
3	B020047	STH 13	CHIPPEWA RIVER	NW	ASHLANI	T-JACOBS(02012	STATE HIGI	ROUTINE	12	2023-10-18		2024-10-31	DUE	
4	B020414	STH 112	WHITE RIVER	NW	ASHLANI	T-WHITE RIVER(	STATE HIGI	UW-DIVE	35	2021-11-02		2024-10-31	DUE	
5	B040098	STH 13	SIOUX RIVER	NW	BAYFIELI	T-BAY VIEW(040	STATE HIGI	UW-DIVE	60		)24-08-2	24-10-31 00:	MISSING	
6	B0501580001	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-12		2024-09-30	PAST-DUE	-1
7	B0501580002	IH 43	QUINCY ST	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
8	B0501580003	IH 43	GBW RR	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
9	B0501580004	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
10	B0501580005	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
11	B0501580006	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
12	B0501580006	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
13	B0501580007	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
14	B0501580007	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
15	B0501580008	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
16	B0501580008	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
17	B0501580009	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-13		2024-09-30	PAST-DUE	-1
18	B0501580009	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
19	B0501580010	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	NSTM (arr	24	2022-09-15		2024-09-30	PAST-DUE	-1
20	B0501580010	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
21	B0501580011	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
22	B0501580011	IH 43	FOX RIVER	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
23	B0501580012	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
24	B0501580012	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
25	B0501580013	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
26	B0501580013	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
27	B0501580014	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	IN-DEPTH	72	2018-11-07		2024-11-30		
28	B0501580014	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
29	B0501580015	IH 43	BLYSBY ST	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
30	B0501580016	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
31	B0501580017	IH 43	LAND	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
32	B0501580018	IH 43	CNW RR	NE	BROWN	C-GREEN BAY(05	STATE HIGI	ROUTINE	24	2022-09-15		2024-09-30	PAST-DUE	-1
33	B0600790001	STH 25	2ND STREET-MINN	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
34	B0600790002	STH 25	MAIN STREET-MIN	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
35	B0600790003	STH 25	LAWRENCE BLVD-I	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
36	B0600790004	STH 25	MISSISSIPPI RIVEF	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
37	B0600790005	STH 25	MISSISSIPPI RIVEF	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
38	B0600790006	STH 25	MISSISSIPPI RIVEF	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
39	B060079003A	STH 25	MISSISSIPPI RIVEF	NW	BUFFALC	T-NELSON(0603	STATE HIGI	ROUTINE	24	2022-06-06		2024-06-30	PAST-DUE	-4
40	B060079003A	STH 25	MISSISSIPPI RIVEF	NW	BUFFALC	T-NELSON(0603	STATE HIGI	NSTM (arr	24	2022-06-06		2024-06-30	PAST-DUE	-4
41	B060752	STH 54	MISSISSIPPI RIVEF	NW	BUFFALC	T-BUFFALO(060	STATE HIGI	ROUTINE	24	2022-06-08		2024-06-30	PAST-DUE	-4
42	B090019	X	STH 29	NW	CHIPPEW	T-SIGEL(09040)	STATE HIGI	IN-DEPTH	72	2017-09-06	)24-12-3	2024-12-31		

Rows | Info

Ready | Accessibility: Good to go

R Inspection Program Management (SIM 1.2.5.7)

MONTHLY SCHEDULING REPORT from HSIS

J	K	L	M
PRIOR_DATE	GRACE_DATE	DUE	STATUS
2023-10-17		2024-10-31	DUE
2023-10-18		2024-10-31	DUE
2021-11-02		2024-10-31	DUE
	2024-08-31	2024-10-31 00:25	MISSING
2022-09-12		2024-09-30	PAST-DUE
2022-09-13		2024-09-30	PAST-DUE
2022-09-13		2024-09-30	PAST-DUE
2022-09-13		2024-09-30	PAST-DUE
2022-09-13		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2022-09-13		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2022-09-13		2024-09-30	PAST-DUE
2022-09-13		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2022-09-13		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2022-09-15		2024-09-30	PAST-DUE
2022-09-15		2024-09-30	PAST-DUE
2022-09-15		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2022-09-15		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	
2018-11-07		2024-11-30	
2022-09-15		2024-09-30	PAST-DUE
2018-11-07		2024-11-30	

STATUS Definitions:

- **Past-Due** = due date has past and an inspection has not been created in HSIS. HSI has no current inspection report started. This designation signifies an inspection hasn't been entered OR has yet to be performed (and will be late).
- **Missing** = structure is flagged requiring this type of inspection, but no inspection of that type exists. As an example, newly constructed bridges that are open to public traffic but have no Routine inspection on file will be categorized with a "Missing" status.
- **Late** = The inspection has been completed in HSI and was performed after the due date.

U Inspection Program Management (SIM 1.2.5.7)

- **Allowable tolerances:**
  - **3 months ≥ 24 month interval**
  - **2 months < 24 months interval**

- Inspections must be complete within the **month due + tolerance**
- Inspection **not** expected to be completed within the allowable tolerance -
  - Responsible PM must notify the Statewide Program Manager (SPM) so inspection options can be considered and **FHWA notified**.
- **FHWA notification = month due - tolerance** = approval for **rare or unusual circumstances**
  - i.e.. 24-month interval due in June – notice to FHWA prior to March
  - i.e.. 12-month interval due in June – notice to FHWA prior to April
- **To stay in compliance, please notify the region or statewide program manager as soon as you are aware that the inspections will not be completed on time.**

Inspection Program Management (SIM 1.2.5.7)

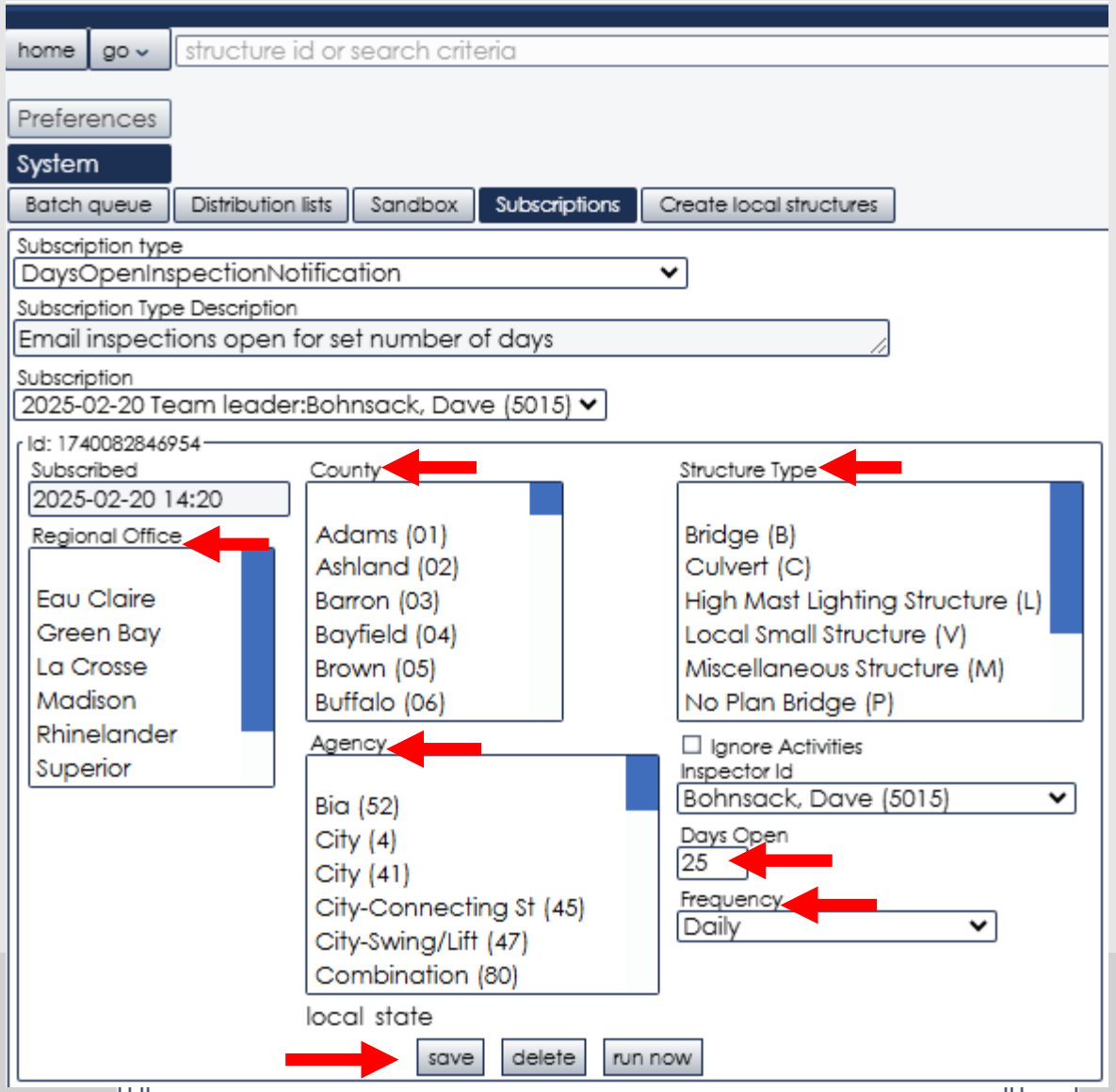
- **Rare and Unusual Circumstances**
  - Construction/rehabilitation scheduling the interference that is unavoidable
  - Safety to public concern
- **Not like to be considered rare or unusual circumstances**
  - Inclement weather
  - Securing inspection contracts
  - Staffing Shortages
  - Improper Scheduling
- **Inspection tolerances are provided to help adjust the inspection schedules**
  - Unforeseen circumstances
  - Scheduling inspection resources
  - Avoid conflicts
  - Assist with workload.
- **FHWA is unlikely to approve a delay of an NSTM inspection.**

Open Inspections Report in HSIS

- Start inspection report within 28 days after the month the inspection is completed.
- Complete the inspection report within 3 months after the month the field portion of the inspection is completed (3 months after the month of the End date).
- Inspections now have a Begin and End date for the field portion of the inspection.
- Open Inspection Report
  - Report started in HSIS but not completed
  - Open reports are sometimes forgotten
- HSIS report available for notification of open inspections reports
  - PMs and TLs should run this report monthly
    - Inspection data must be updated within 3 months from the month the inspection is completed.
    - PMs follow up with TLs regarding open inspection reports of more than 2 months.
      - Time is needed to complete any activities or follow-up actions.
  - HSIS subscription available for the report – DaysOpenInspectionNotification

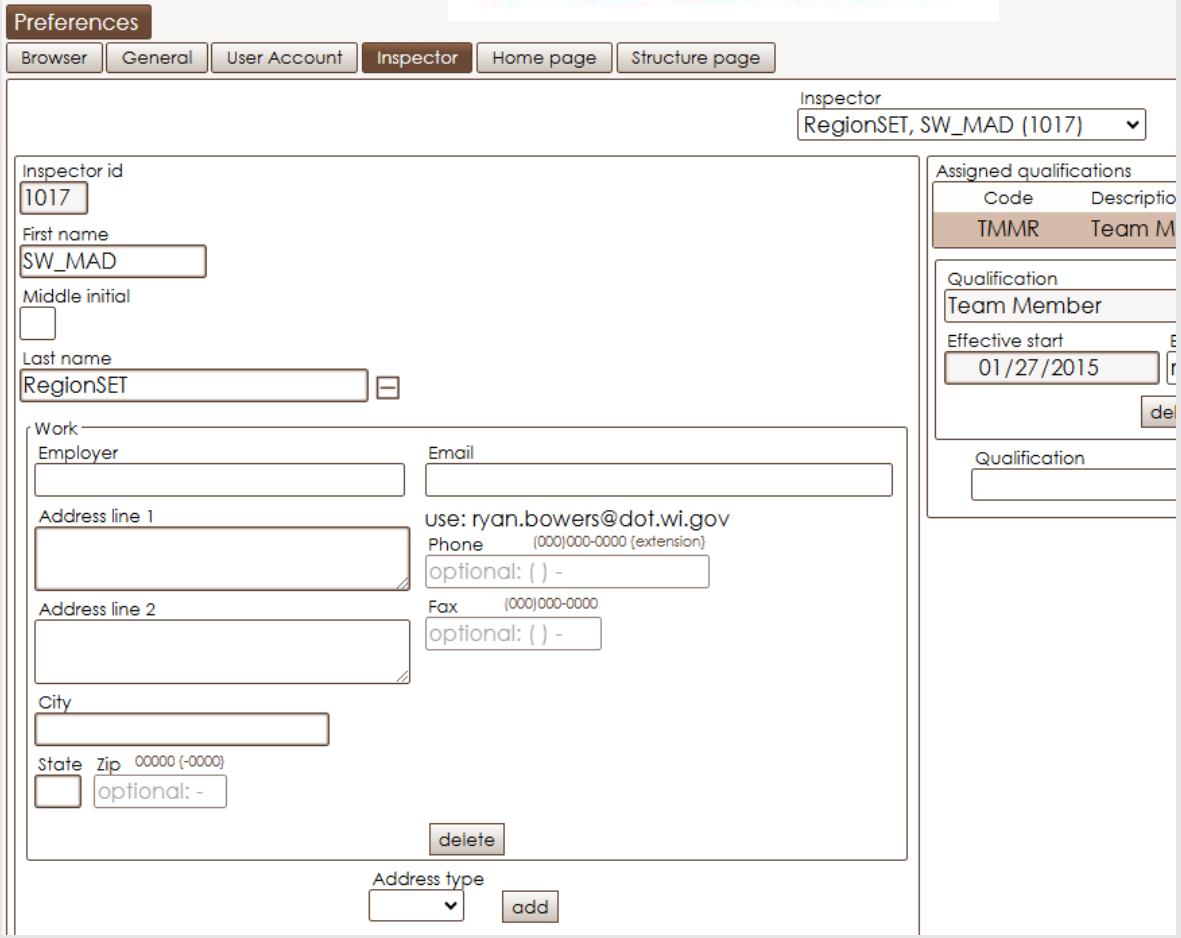
Open Inspections Reports

- Setting up a subscription in HSIS
  - In HSIS, on main menu select **Go>>Tools>>System>>Subscription**
    - Subscription Type – dropdown menu under heading **Subscription not found**
    - Select subscription for
    - **DaysOpeninspetionNotification**
    - Select **subscribe**
      - Tab will expand
    - Select
      - **Region Office**
      - **County**
      - **Agency**
      - **Structure Type** (B and P),
      - **Days Open** - enter preferred number
      - **Frequency** - report should be sent
    - Select **Save**
- Subscription will automatically be emailed



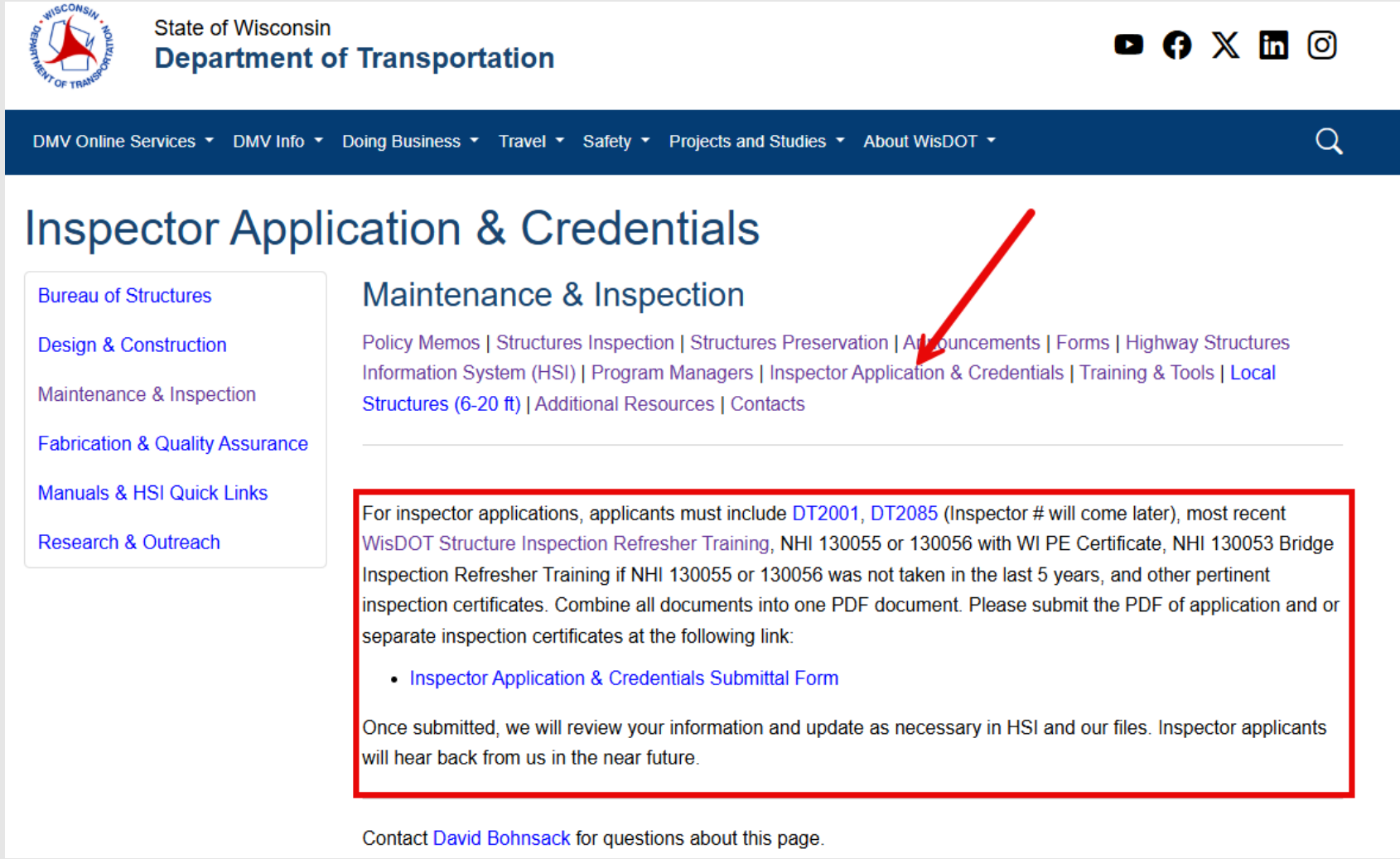
Inspector Contact Information

- NBIS requires current contact information for all certified bridge inspectors.
- Annually update inspector's information in HSIS
- In HSIS - **Preference** >> **Inspector** tabs
  - Email address
  - Employer name.
  - Work address
  - Telephone number
- Information will be required before inspection can be completed



R Inspector Application & Credentials

- Found on BOS Website
- Use Submittal Form Link
- Need NHI Refresher qualification (130053, 130055, 130056) and most recent WisDOT refresher to be TL qualified



State of Wisconsin
Department of Transportation

DMV Online Services | DMV Info | Doing Business | Travel | Safety | Projects and Studies | About WisDOT

Inspector Application & Credentials

- Bureau of Structures
- Design & Construction
- Maintenance & Inspection
- Fabrication & Quality Assurance
- Manuals & HSI Quick Links
- Research & Outreach

Maintenance & Inspection

Policy Memos | Structures Inspection | Structures Preservation | Announcements | Forms | Highway Structures Information System (HSI) | Program Managers | Inspector Application & Credentials | Training & Tools | Local Structures (6-20 ft) | Additional Resources | Contacts

For inspector applications, applicants must include DT2001, DT2085 (Inspector # will come later), most recent WisDOT Structure Inspection Refresher Training, NHI 130055 or 130056 with WI PE Certificate, NHI 130053 Bridge Inspection Refresher Training if NHI 130055 or 130056 was not taken in the last 5 years, and other pertinent inspection certificates. Combine all documents into one PDF document. Please submit the PDF of application and or separate inspection certificates at the following link:

- Inspector Application & Credentials Submittal Form

Once submitted, we will review your information and update as necessary in HSI and our files. Inspector applicants will hear back from us in the near future.

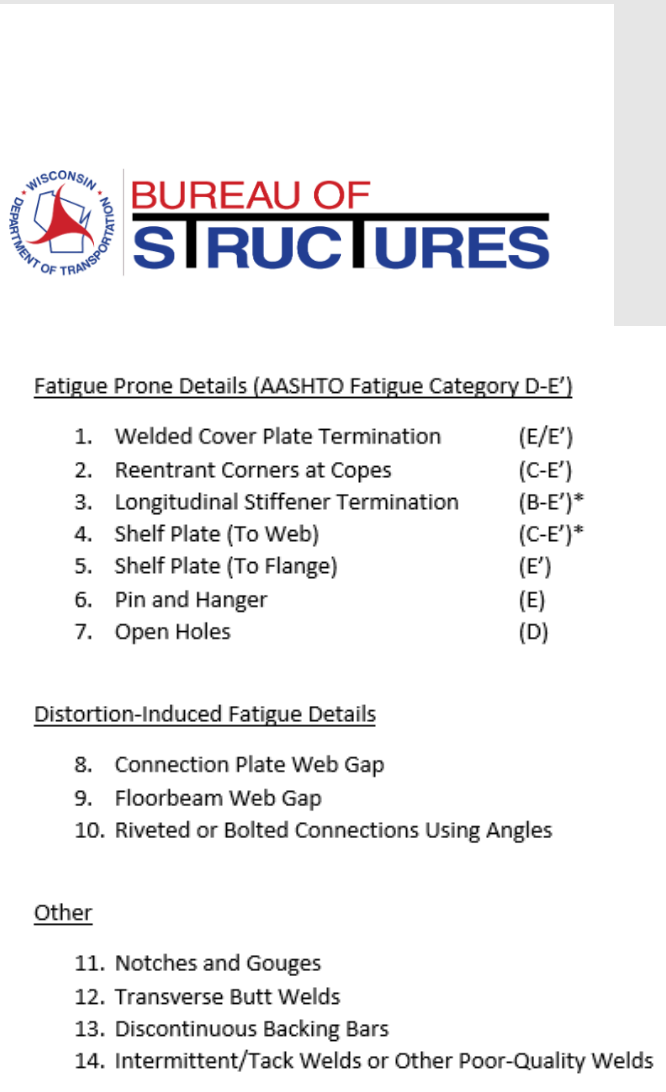
Contact David Bohnsack for questions about this page.

N

Fatigue-Prone Detail Inspection Manual

New Reference Manual Develop by WisDOT

- Found on BOS website and training course materials folder.
- Fatigue-Prone Detail – steel details/connections that are highly susceptible to fatigue damage due to repeated loads leading to crack initiation and propagation.
- Inspector must note fatigue prone details in the Structure Specific Notes in the inspection report.
- B.IR.02 Fatigue Details – requires reporting if category E or E’ details exist (Y or N).



BUREAU OF STRUCTURES

Fatigue Prone Details (AASHTO Fatigue Category D-E’)

1.	Welded Cover Plate Termination	(E/E’)
2.	Reentrant Corners at Copes	(C-E’)
3.	Longitudinal Stiffener Termination	(B-E’)*
4.	Shelf Plate (To Web)	(C-E’)*
5.	Shelf Plate (To Flange)	(E’)
6.	Pin and Hanger	(E)
7.	Open Holes	(D)

Distortion-Induced Fatigue Details

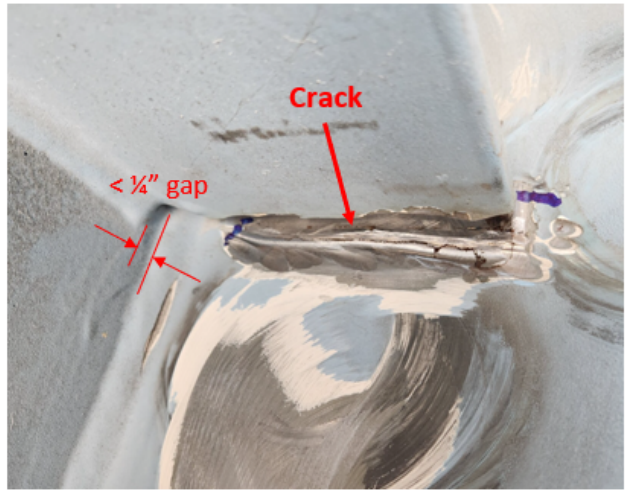
8. Connection Plate Web Gap
9. Floorbeam Web Gap
10. Riveted or Bolted Connections Using Angles

Other

11. Notches and Gouges
12. Transverse Butt Welds
13. Discontinuous Backing Bars
14. Intermittent/Tack Welds or Other Poor-Quality Welds

Fatigue-Prone Detail Inspection Manual

1. Welded Cover Plate Termination	
Detail Category: E/E’	
Prevalence: Common	
Note: Coverplates are often used with rolled W-shape girders in the positive and negative moment regions. The top cover plates cannot be inspected as they are covered by deck. If a redeck occurs, these should be inspected. Nature of Crack: Often forms at the toe of the weld at the tip of the coverplate. Repair Method: Grind out crack. If 1/16” or less in depth, no further action needed. Consider weld peening. If greater than 1/16” used bolted splice or similar. Photo Location: B-40-196	

3. (continued) Intersecting Welds at Longitudinal Stiffener Plates	
Detail Category: n/a	
Prevalence: Uncommon	
Note: Again, three conditions are needed to be considered a CIF detail. In this example a crack developed between the longitudinal stiffener and the vertical stiffener. This interrupted the flow of stress through the longitudinal stiffener which then had to pass through the web (stress riser). This detail made itself a CIF detail when it cracked, but sometimes the longitudinal stiffener is intentionally not welded to the vertical and there is an abrupt end. The ¼” gap is an important consideration when this is the case. If it is ¼” or greater than the risk is low, less than that however is more at risk of CIF, as was the case here. Nature of Crack: little to no warning Repair Method: cut longitudinal stiffener back and provide smooth radius as shown in the 2nd photo. Photo Location: B-40-400 (Hoan)	

Knowledge Check

A bridge inspection was due the prior month and the inspection report has not been created in HSIS. What will the STATUS show in the Monthly Scheduling Report?

Past-Due

HSIS Update

Ryan Bowers

Structures Asset Management Engineer

2025 Structure Inspection Refresher Webinar

March 19, 2025

Topics

- Recent updates
- Reminders

Release notes

Highway Structures Information System (HSI)

- Bureau of Structures
- Design & Construction
- Maintenance & Inspection
- Fabrication & Quality Assurance
- Manuals & HSI Quick Links
- Research & Outreach

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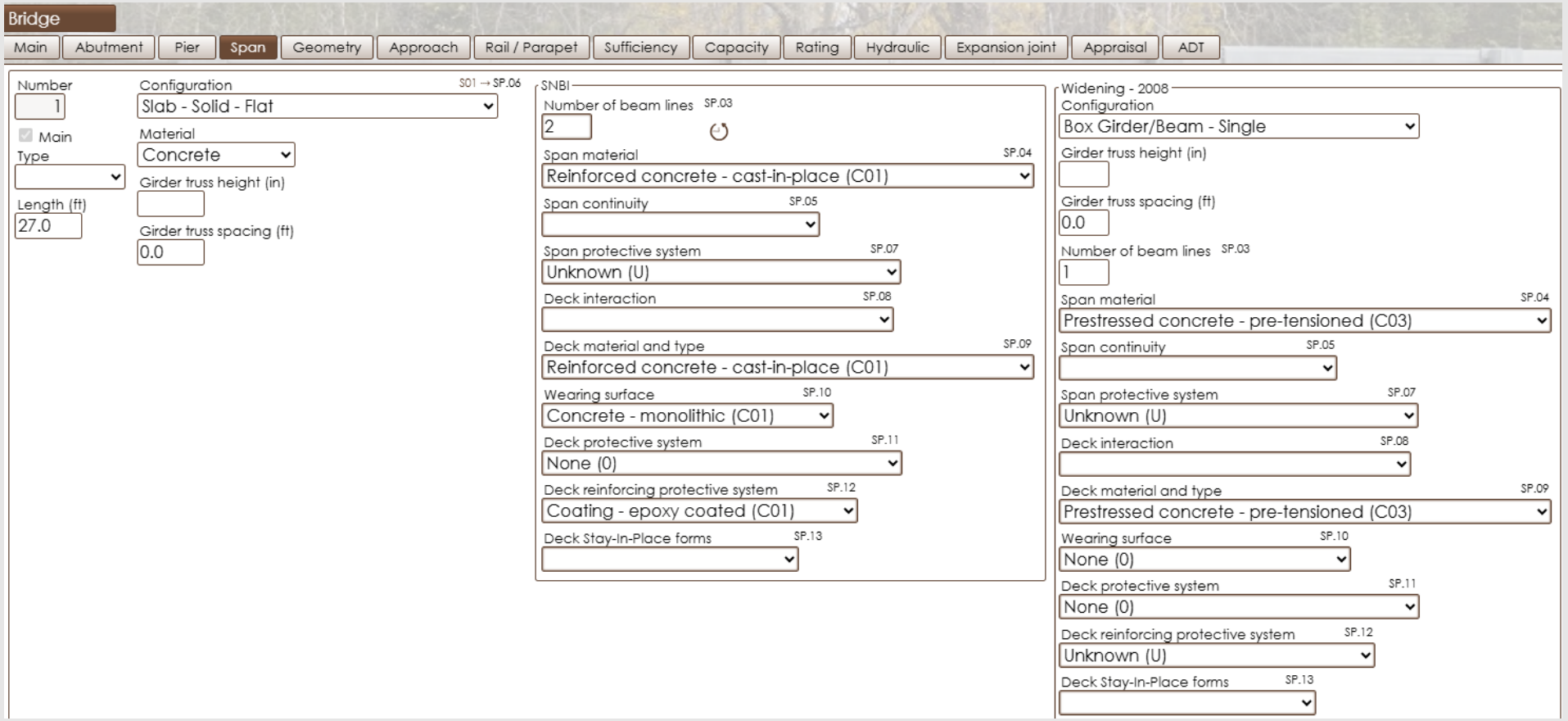
Quick Links

- HSI Application
- HSI Quick Guide

Updates and Release Notes

- Release Notes - September 2024
- Release Notes - April 2024
- Release Notes - February 2024
- Release Notes - October 2023
- Release Notes - September 2023

Widening data sets

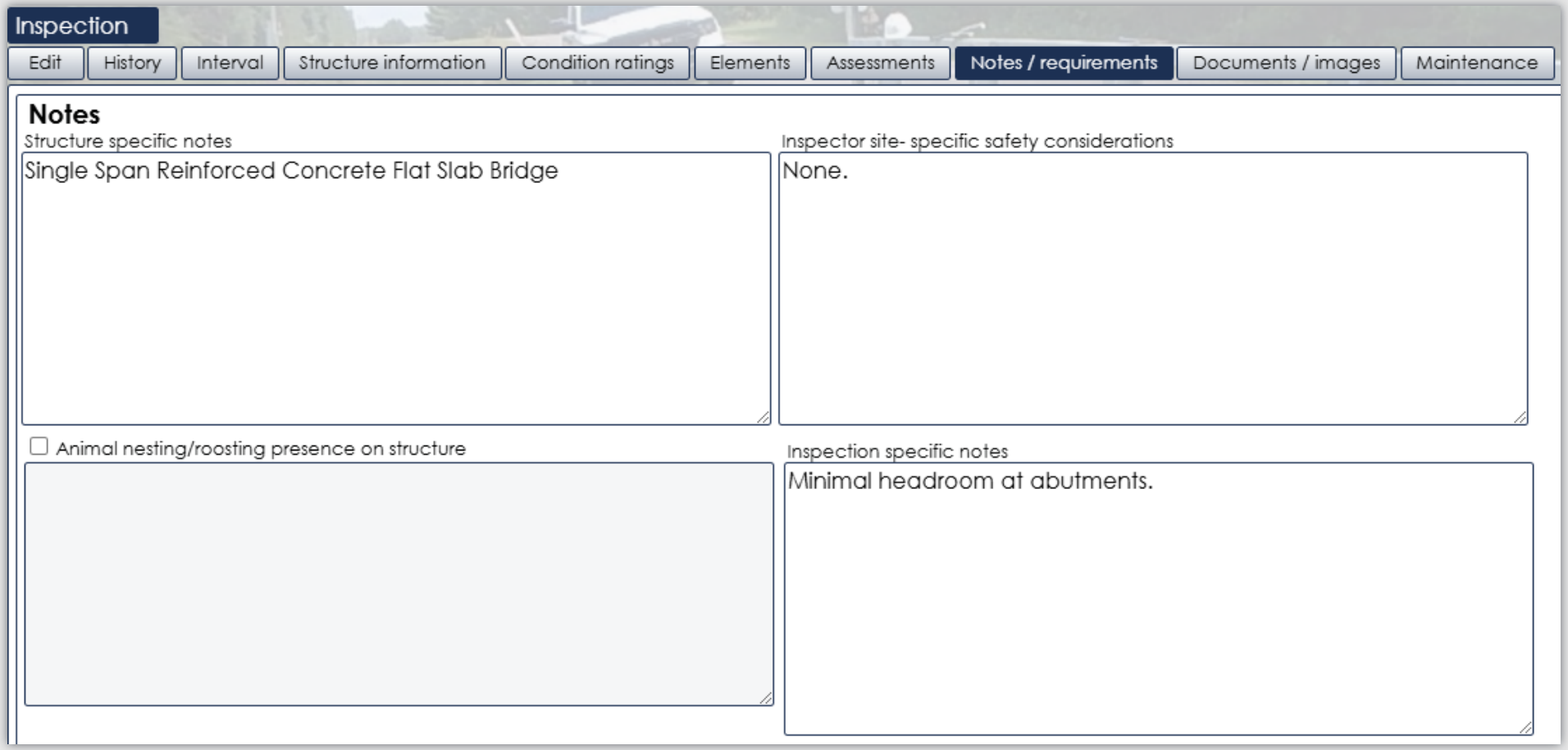


N

Widening data sets

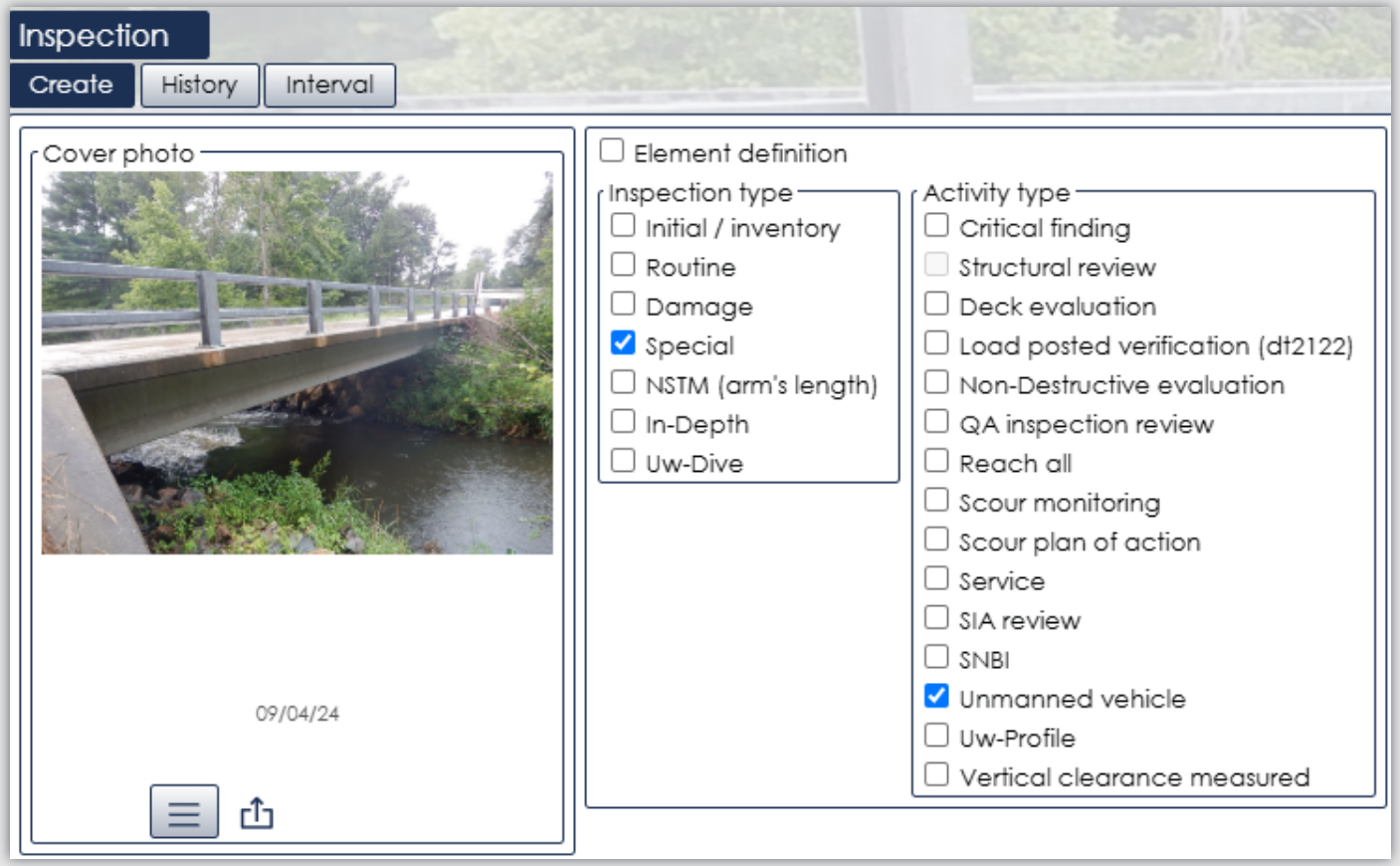
- Superstructure and substructure data has been populated.
  - Review data, correct where wrong.
  - Populate missing data.
  - Contact me if a widening is missing.

Bats

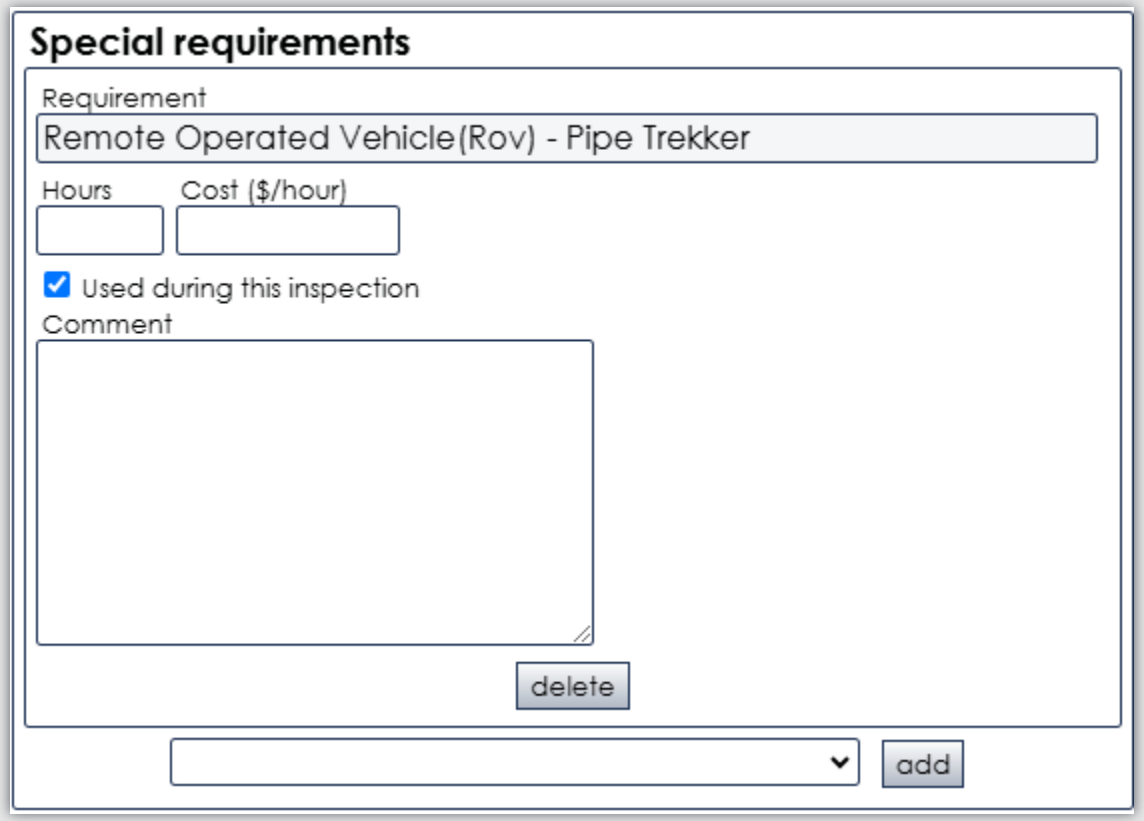

Inspection
Edit
History
Interval
Structure information
Condition ratings
Elements
Assessments
Notes / requirements
Documents / images
Maintenance
Notes
Structure specific notes
Single Span Reinforced Concrete Flat Slab Bridge
Inspector site- specific safety considerations
None.
Animal nesting/roosting presence on structure
Inspection specific notes
Minimal headroom at abutments.

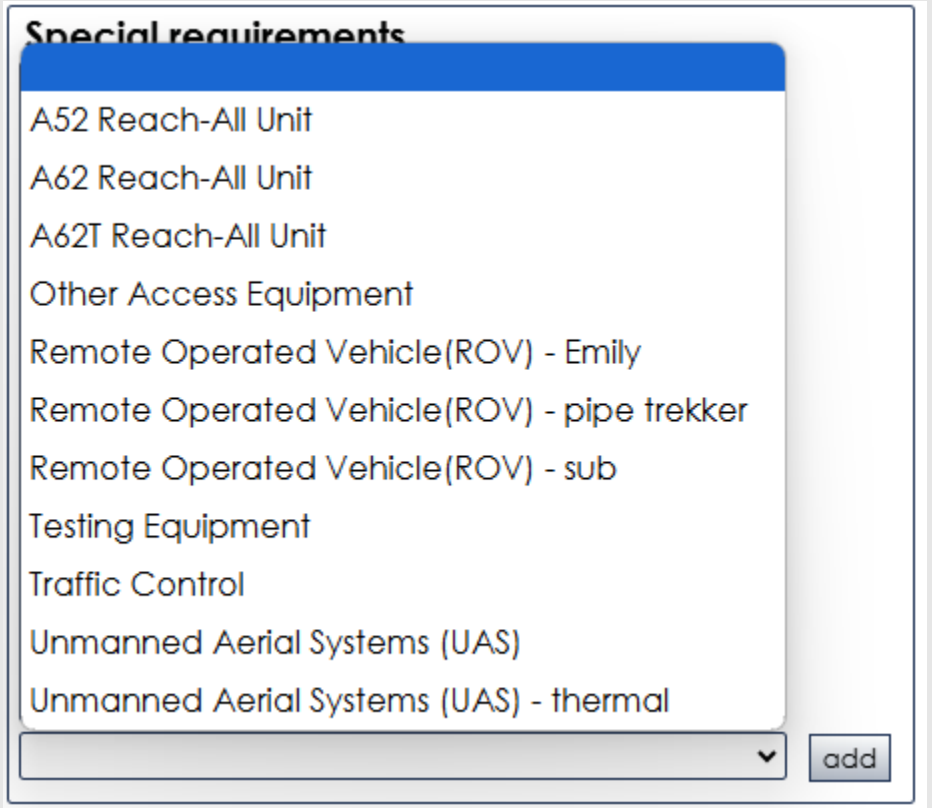
Unmanned Vehicle Activity

- Works like reach all activity.
  - Need to select an inspection type for it to appear.
- Only available for bridges now.



Unmanned Vehicle Activity





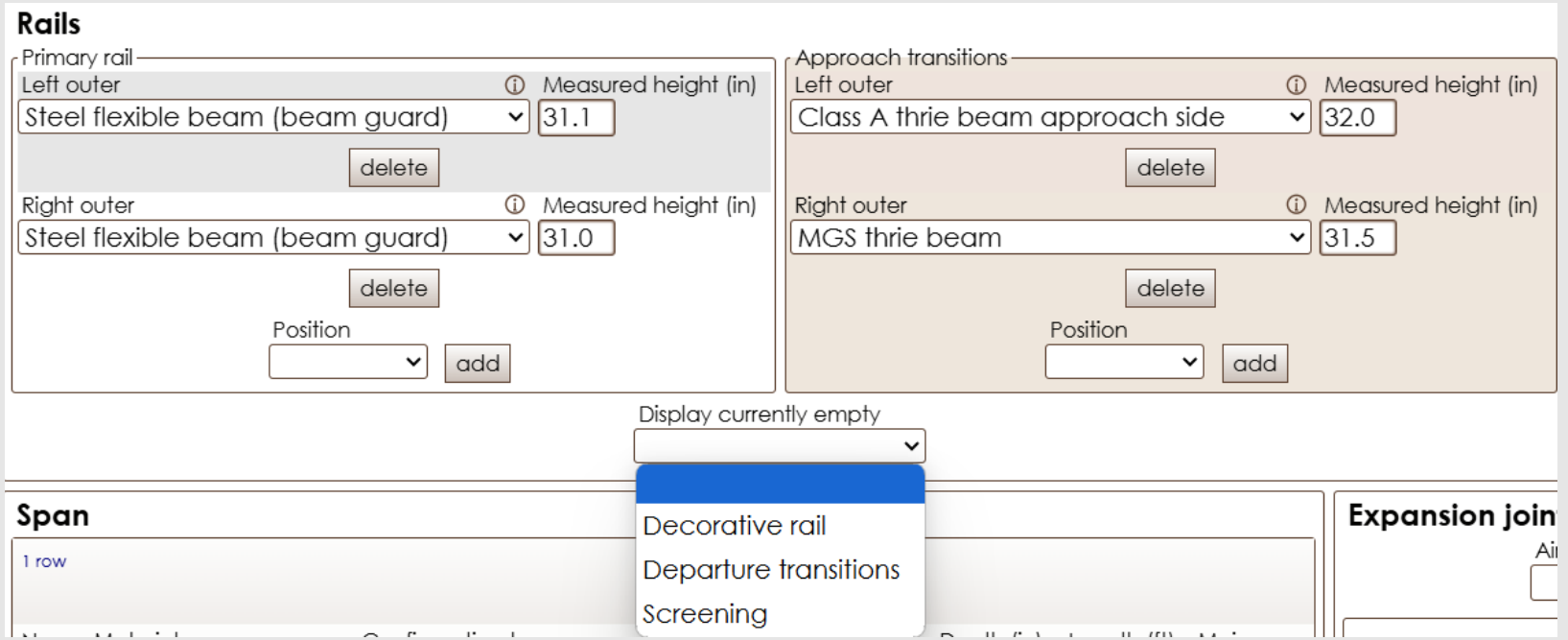
Railings

Inspection complete disabled

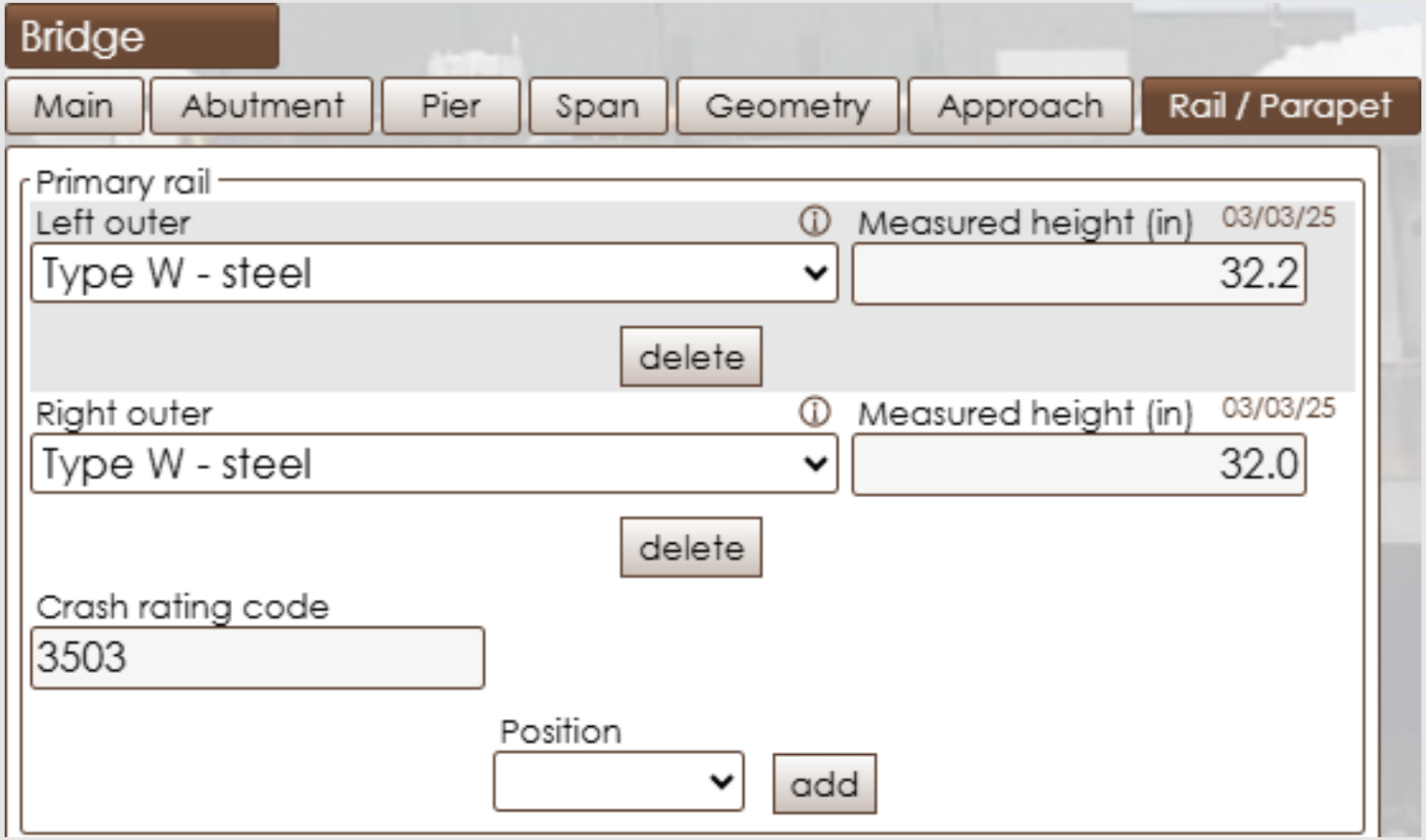
Reason

missing required rail measurement for Primary Rail left outer Steel flexible beam (beam guard)

missing required rail measurement for Primary Rail right outer Steel flexible beam (beam guard)



Railings


Bridge
Main
Abutment
Pier
Span
Geometry
Approach
Rail / Parapet
Primary rail
Left outer
Measured height (in)
03/03/25
Type W - steel
32.2
delete
Right outer
Measured height (in)
03/03/25
Type W - steel
32.0
delete
Crash rating code
3503
Position
add

N

Out-of-Order Inspections

- Changes made behind-the-scenes on what inspections and activities data is copied from.
- If an inspection is entered with a date earlier than an inspection already in HSIS
  - On-complete message stating notification will be sent.
  - An email is sent to user that submitted the inspection, the user that submitted the subsequent inspection, and the region PM.

Out-of-order Inspections

On-Complete

Action	Reason
complete with e-signature: Ryan Bowers(DOTRYB)	complete with e-signature based on user preferences
send out-of-sequence inspection review notification	signficant values changed in inspection created prior to existing

HSI ACPT: B-01-009 out-of-sequence Inspection review notification

DH HSI 2024-11-21 (3.0.1-1354) on ACPT at 0A442E75 <WisDOT-HSI@dot.wi.gov>
To Bowers, Ryan - DOT

Reply

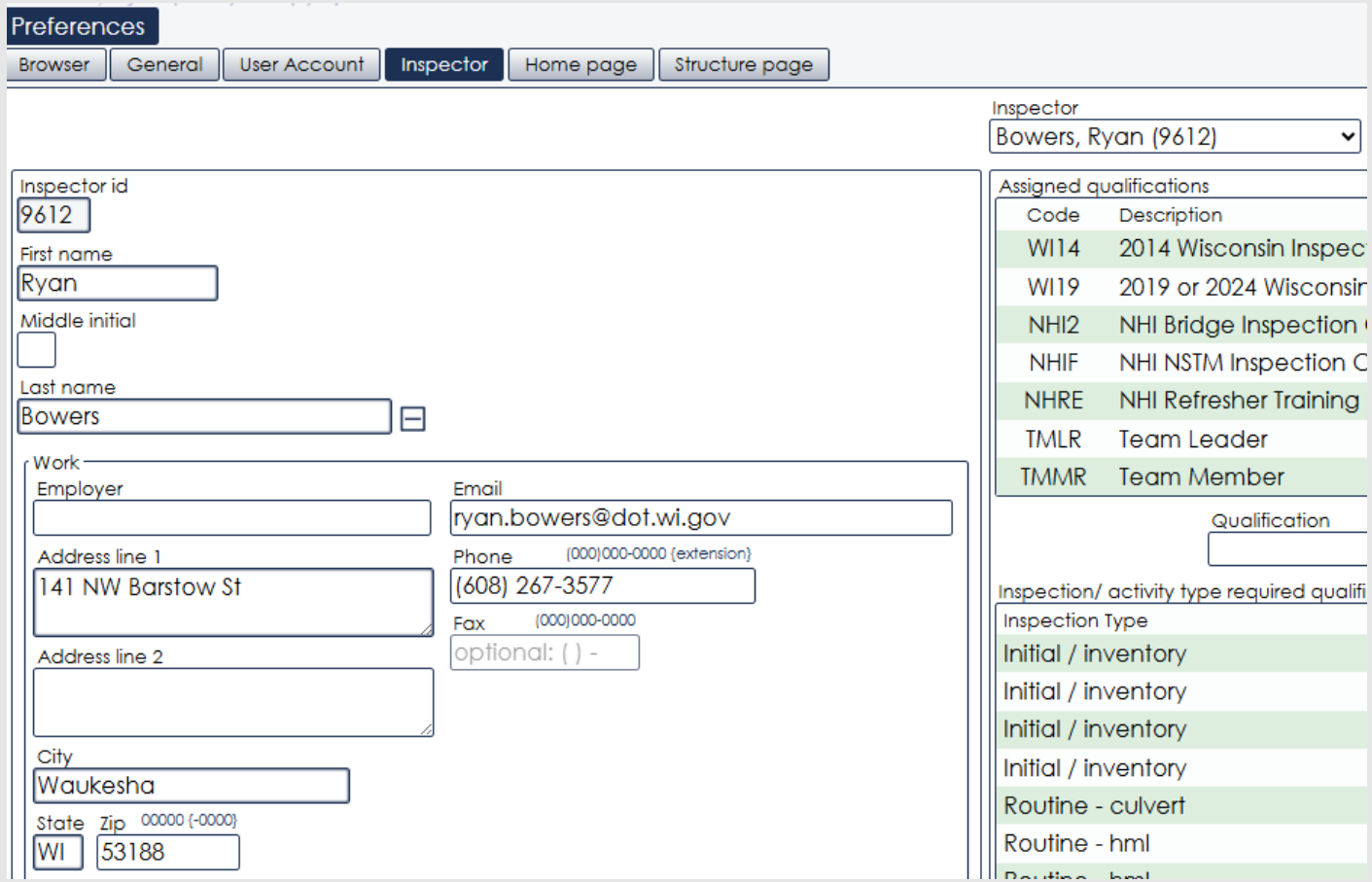
Start your reply all with: Received, thank you. Thank you! Thank you for the report. Feedback

An inspection was completed for B-01-009 with end date 09/15/24 which preceeds previously completed inspection(s). Complete review of all subsequent inspections is recommended.

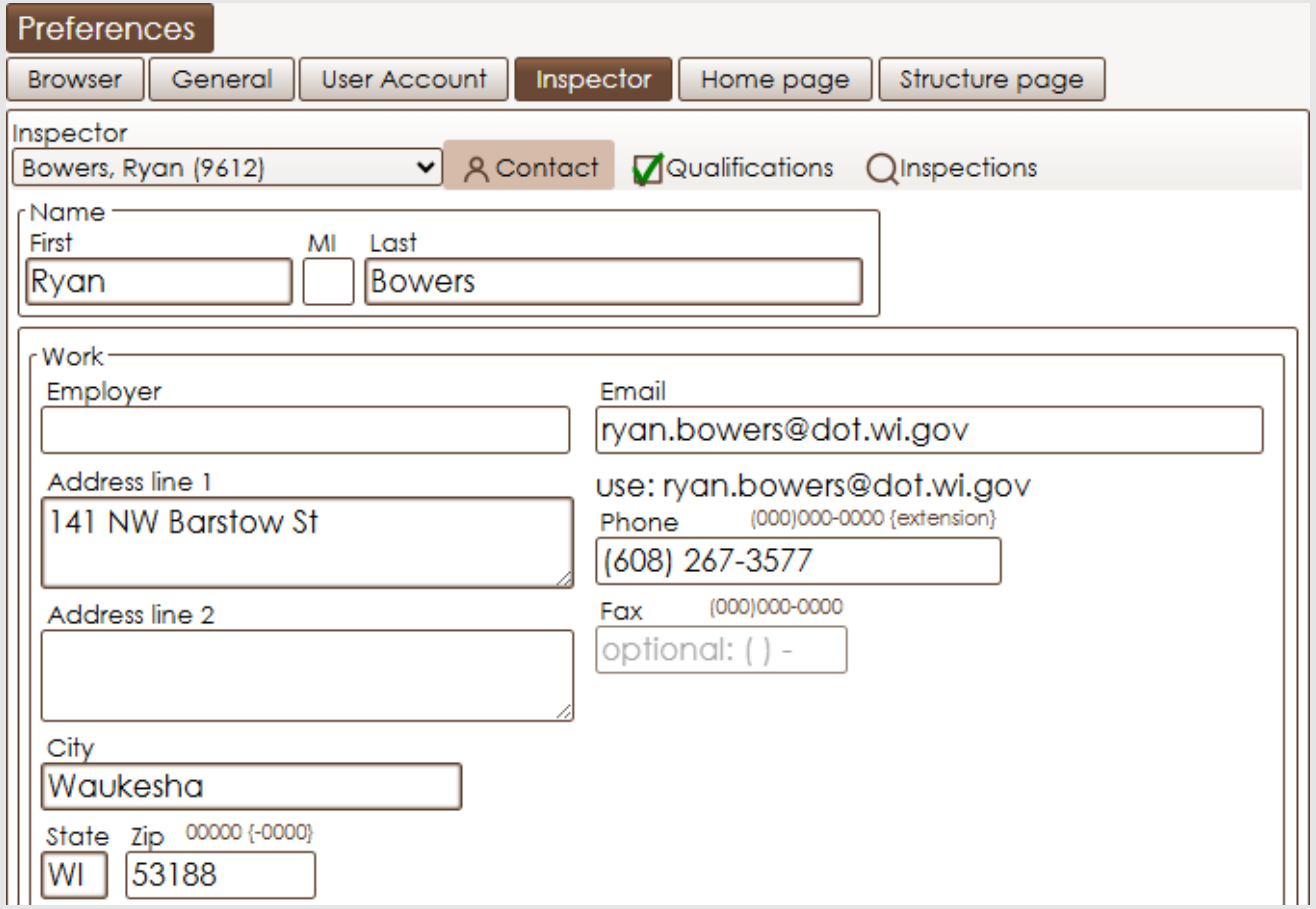
Specific concerns identified are:

Deck Good (7) in more recently entered 09/15/24 'INT' does not match Satisfactory (6) in previously entered (subsequent) 10/01/24 'R','SNBI'
Superstructure Good (7) in more recently entered 09/15/24 'INT' does not match Satisfactory (6) in previously entered (subsequent) 10/01/24 'R','SNBI'
Substructure Fair (5) in more recently entered 09/15/24 'INT' does not match Satisfactory (6) in previously entered (subsequent) 10/01/24 'R','SNBI'
BridgeRailings Good (7) in more recently entered 09/15/24 'INT' does not match Satisfactory (6) in previously entered (subsequent) 10/01/24 'R','SNBI'
Reinforced concrete slab CS2 quantity 11 in more recently entered 09/15/24 'INT' does not match 15 in previously entered (subsequent) 10/01/24 'R','SNBI'
Reinforced concrete slab -> Cracking (RC) CS2 quantity 11 in more recently entered 09/15/24 'INT' does not match 15 in previously entered (subsequent) 10/01/24 'R','SNBI'
Reinforced concrete abutment CS2 quantity 3 in more recently entered 09/15/24 'INT' does not match 0 in previously entered (subsequent) 10/01/24 'R','SNBI'
Reinforced concrete abutment -> Delamination - spall - patched area in more recently entered 09/15/24 'INT' does not match null/missing in previously entered (subsequent) 10/01/24 'R','SNBI'

Inspector information



Inspector information



REMINDERS!

- Bridge length
- Inspection end date

G.01 NBIS Bridge Length and G.02 Total Bridge Length

Examples – NBIS Bridge Length

Report measurement A.

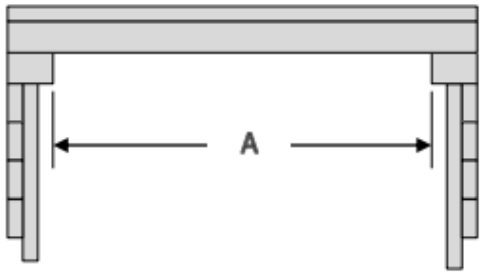


Figure 14. Profile view of a single span bridge with pile bent abutments.

Report measurement A.

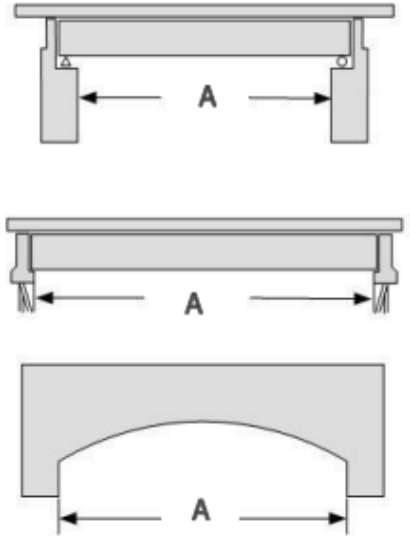


Figure 15. Profile views of various single span bridges.

Examples – Total Bridge Length

Report measurement A.

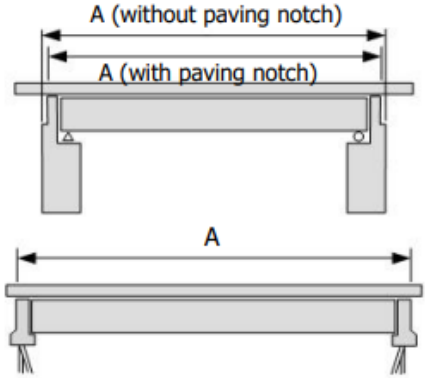


Figure 19. Profile views of various single span bridges.

Report measurement A.

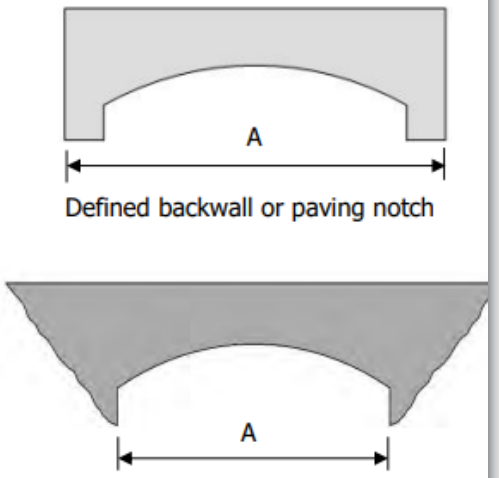
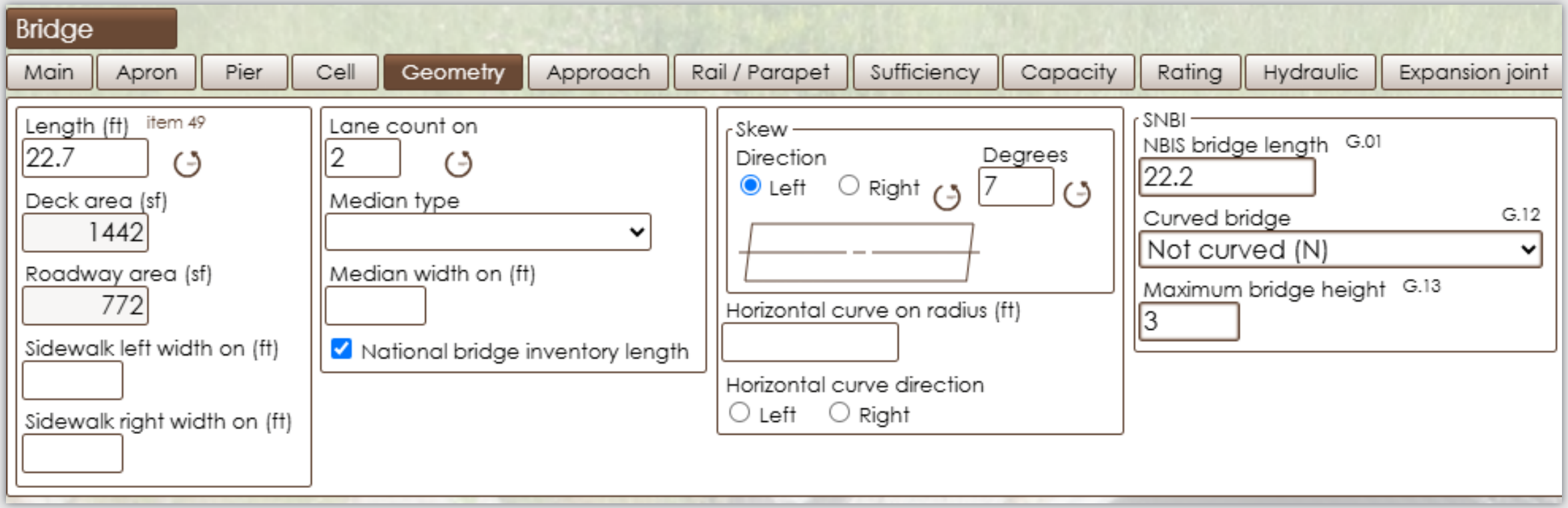


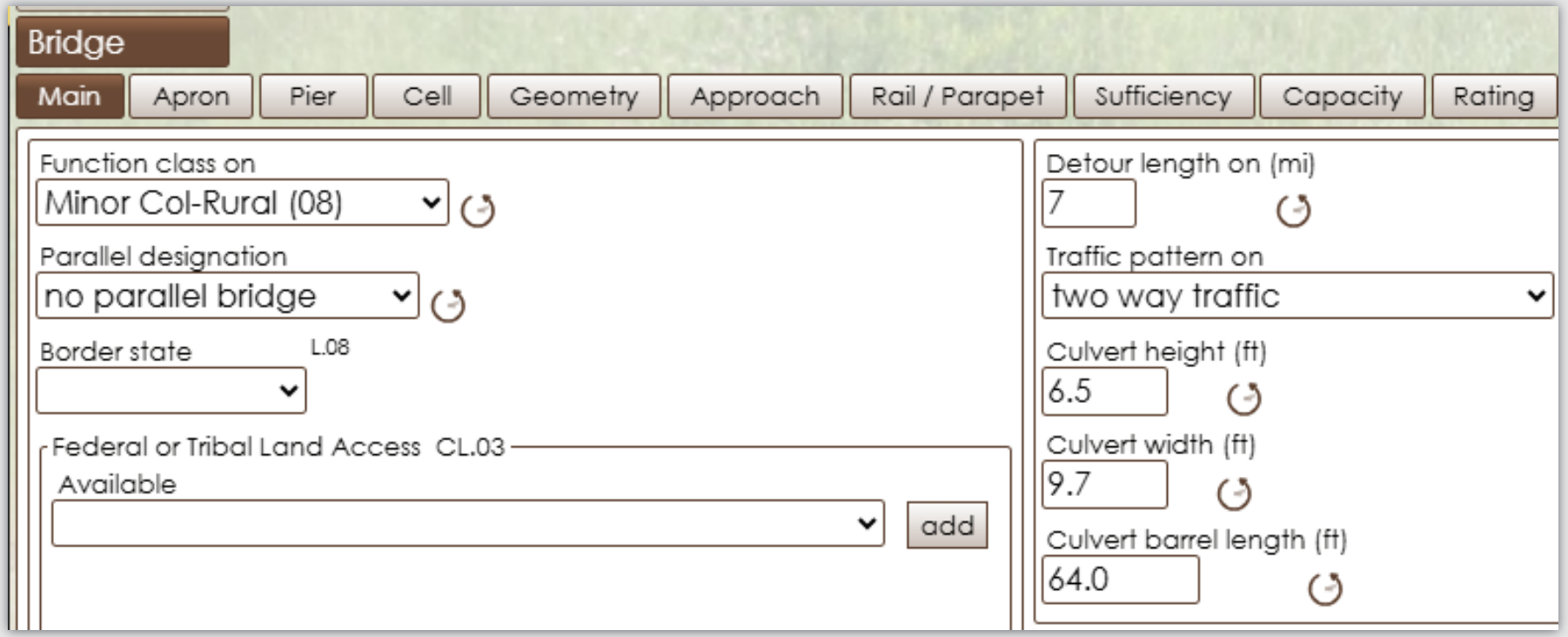
Figure 20. Profile views of various spandrel arches.

Bridge length



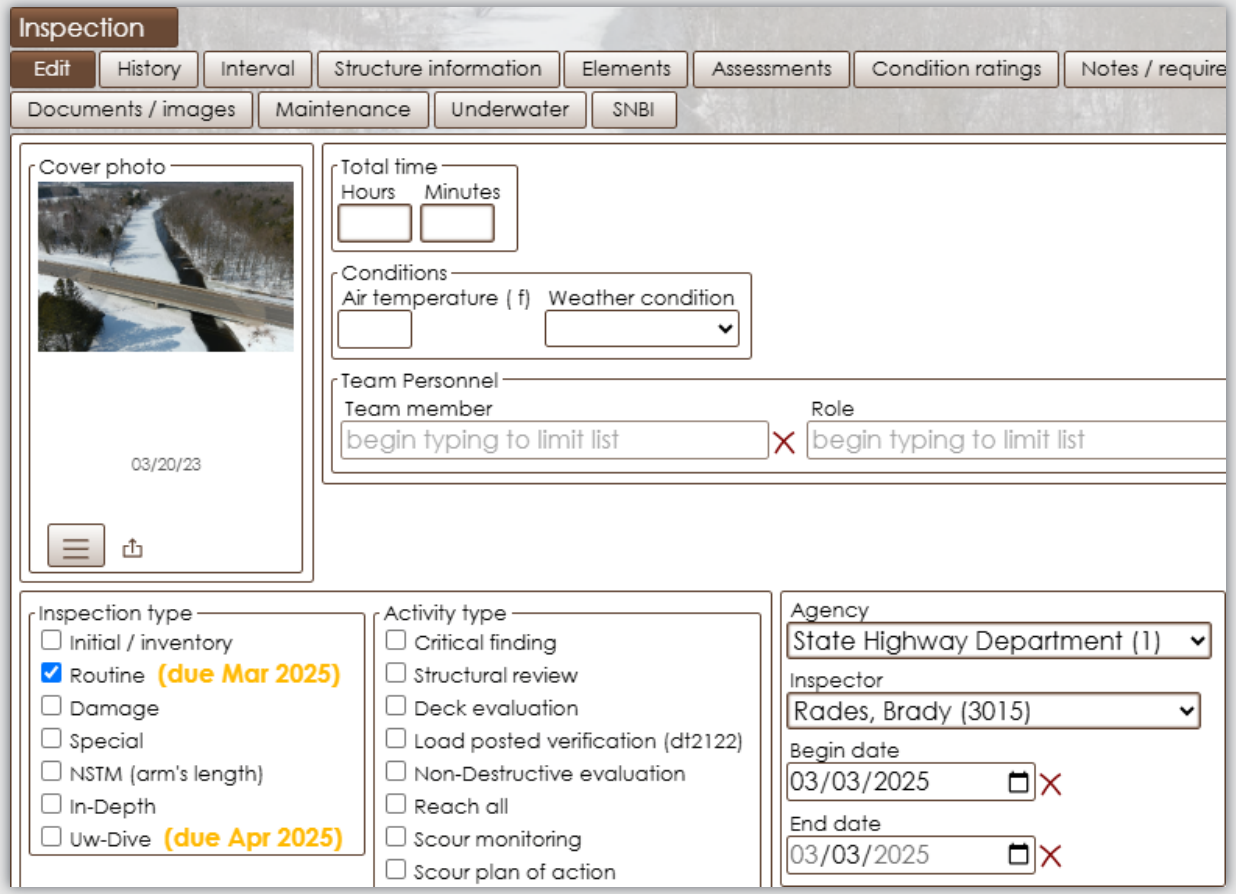
R

Bridge length



R

Inspection end date



Knowledge Check

How often should an inspector look to update their contact information in HSIS? If information is not provided will they be able to complete an inspection?

Annually

No, All information will need to be provided

Initial Inspection

First inspection of a new, replaced, or rehabilitated bridge.

- **WisDOT** will complete initial inspections for new/rehabilitated state and local highway bridges when any primary structure work is completed as part of a state let project:
  - i.e. New structure, structure replacement, deck replacement, structure widening, overlay involving deck repair/rehab, full painting, structure raising, strengthening by retrofit, etc.

- **Local owners** are responsible for initial inspections for all other new or rehabilitated local system bridges, including newly found bridges.

Initial Inspection

- Initial inspections preferably should be completed before the structure is open to traffic **but must be completed no later than 3 months after opening to traffic.**
- Repairs, maintenance, or preservation activities do not prompt an initial inspection.
- Newly found bridge – initial inspection completed no later than 3 months after a bridge ID is assigned.
- **Special Inspection** - repairs or overburden changes required within 6 months of completed work.

Damage Repair or Overburden Change

Special Inspection

when not related to a rehabilitation project

- **Required after damage repairs are completed** (if Damage inspection closed)
  - Updated the element(s) condition states and component condition ratings, when applicable.
- **Overburden change due to a maintenance or preservation activity –**
  - Update the overburden quantity
  - Update the element(s) condition states and component condition ratings when applicable.
- **Complete within 6 months of the repair or overlay.**
- **SIM 1.3.10.3**

Inspections of Bridges Under Construction

1. A completed new bridge not open to public traffic is not subject to the inspection requirements until any portion of the bridge is opened to traffic.
2. Existing bridge closed to traffic during rehabilitation - initial inspection within 3 months of any portion of the bridge reopening to traffic.
3. Existing bridge open to traffic during rehabilitation - continue to have regular scheduled inspections on all portions open to traffic. Complete initial inspection within 3 months of the completion of the work.
4. If during construction, a required inspection cannot be conducted due to extenuating circumstances, contact the Statewide Program Manager, and receive preapproval from FHWA for any delayed inspection.
    - **Inspections delayed beyond the inspection due date, plus the tolerance must be preapproved by FHWA.**
5. Consideration: Include provisions in construction contract requiring the contractor have NBIS inspections performed when due while the construction project is underway.

U

Inherent Defects

1. Typically identified during an initial inspection
2. Results from normal construction practices - it is not indicative of damage or deterioration.
3. An inherent defect by itself would not result in a maintenance, preservation, or repair action.
4. Describe the inherent defect including the location and extent under the defect's narrative section for the element that closely represents the inherent defect and rate as **CS1**.
5. Examples of inherent defects - not an all-inclusive list.
    1. Poorly consolidated concrete (honey combing) with penetration depth <=1" without exposed rebar.
    2. Chert pop-outs, generally <=1" depth or <=3" width.
    3. Snowplow/vehicle scrapes/gouges that do not expose coarse aggregate.
    4. Grinding of the wearing surface which does not create a loss of friction.
    5. Patched areas on the top flanges of prestressed girders from construction framing hangers.
    6. Patched holes in the deck surface from parapet forming practices.
    7. Patched area in deck or abutment from joint replacement.
    8. Rust stains from rebar chairs or forming ties.

U

Not Inherent Defects

Defects attributed to poor construction practices or poor material qualities that would likely lead to future maintenance or preservation actions are to be rated for the element in the appropriate CS. Some typical defects resulting from poor construction practices (not an all-inclusive list):

1. Poorly consolidate concrete with penetration depth >1" or with exposed rebar (Delamination/Spall = CS3).
2. Small spalls on the top flanges of prestressed girders from construction framing hangers that are not patched.
3. Damage to girders from handling or the chain tie-downs to the trailers.
4. Dents in the top flanges of girders from deck removals (distortion defect).
5. Chert pop-outs, generally >1” depth or >3” width (Delamination/Spall = CS2).
6. Tight cracks (state size) in prestressed members as delivered or as initially installed. i.e. End cracks or top flange cracks in wide flange girders.
7. Grinding of the wearing surface which results in loss of friction.

Knowledge Check

A new bridge is getting constructed and should be completed soon. When should the inspector perform the initial inspection? When must the Initial inspection be completed?

Before opening the bridge to traffic

3 months after opening to traffic

Temporary Bridges

1. Open to public highway traffic - subject to the NBIS rules and regulations.
2. WisDOT let project – contractor responsibilities included in WisDOT's Standard Specifications
    a. Completed inspection before opening to traffic.
    b. Inspection report provided to project management team.
3. When used for emergency or in place of a failed/failing bridge not related to WisDOT let project
    a. Bridge owner/highway authority is responsible to have the inspection completed.
    b. Must be inspected no later than 3 months after opening to traffic.
    c. Copy of inspection report provided to appropriate PM.
4. Temporary bridge open to traffic greater than 24 months must be inspected and inventoried at 24 months and data entered into HSIS.
    a. A bridge ID must be assigned – contact WisDOT Region PM.
    b. For WisDOT let project, updates coming in ASP-6 puts responsibilities on the contractor.

R

Closed Bridge Inspection

- Closed bridge inspection is a Routine inspection.
- Bridges closed to highway traffic remaining in HSIS as highway bridges must continue to have a Routine inspection.
  - Assess/evaluate for safety of users of under-bridge facilities
- Evaluate the condition of the closure system – barricades, barrier, and signage.
  - Assessment 9036 Bridge Closure Systems
  - Unsafe conditions should be responded to immediately by the responsible party
- NSTM, Complex, Underwater, etc. inspections not required for a closed bridge unless needed to determine stability. Consult with the region PM to determine if other inspection types should continue.
- Conducted on a **12-month interval**.
- SIM 1.3.14

Scour Monitoring Activity SIM 1.3.7

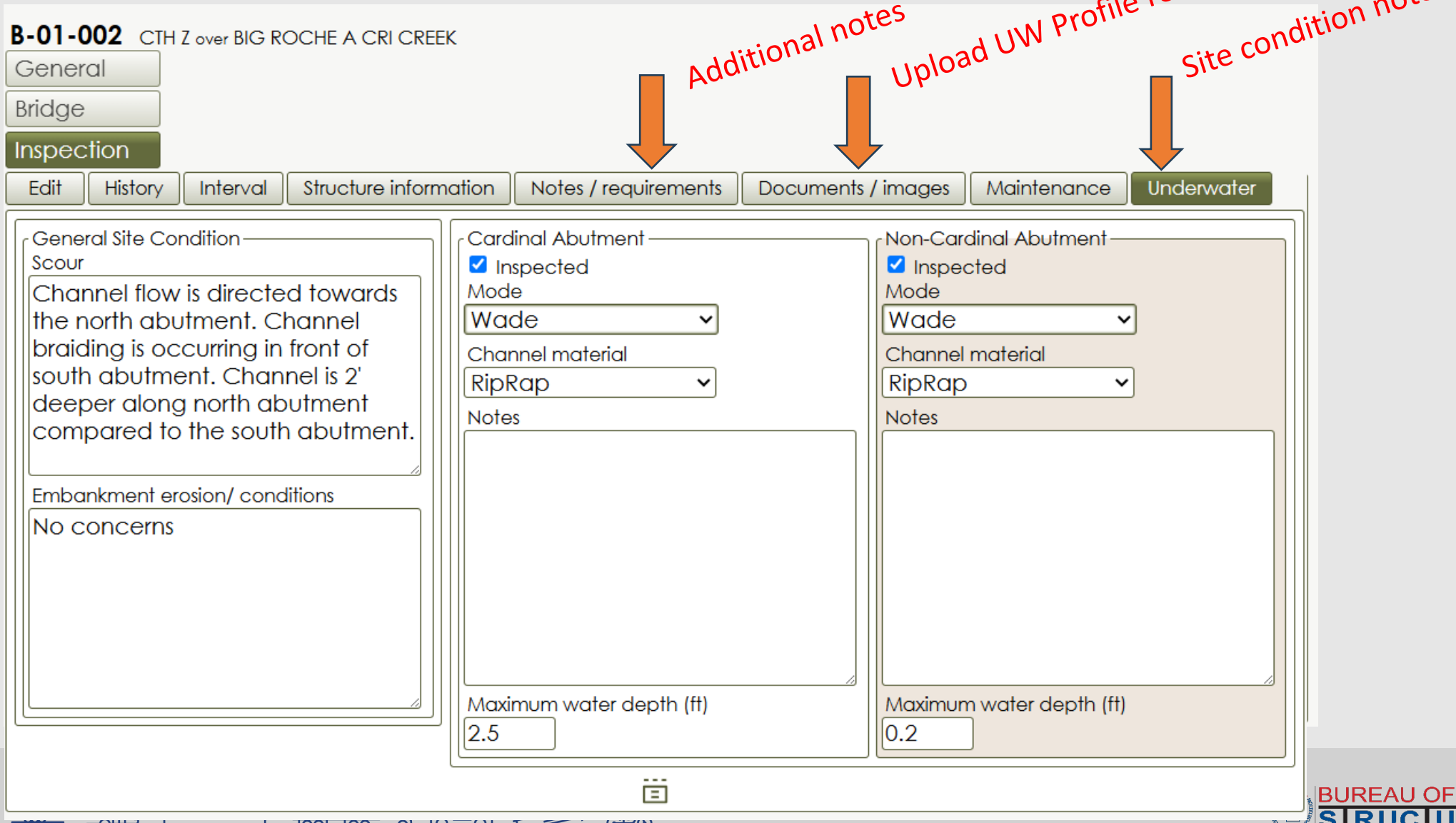
Monitoring during and after a flood event – includes UW Profiles, as needed:

- Scour Critical Bridges - required after a flood trigger event identified in an implemented scour plan of action (POA)
- Required at a flood effected bridge with signs of channel movement, degradation, or aggradation.
- Recommended at bridges when the bridge experiences any of the following:
    1. A flood event when the bridge or the roadway approach is overtopped.
    2. A river system reaches flood stage at a bridge.
    3. The presence of highwater flow velocities which could cause scour.
    4. If determined by the bridge owner or inspection program manager.
- SIM Section 1.3.6 provides additional information on underwater profiles.
- Scour Monitoring Activity can be created in HSIS without selecting an inspection type.

Special or Damage Inspection may be required if impacts to element or condition rating has occurred or to identify maintenance/repair actions.

Scour Monitoring Activity SIM 1.3.7

- Scour Monitoring Activity can be created without selecting an inspection in HSIS.



Underwater Dive Inspections

Quality Control / Quality Assurance

- WisDOT will complete QA review of UW Dive inspections
- Consultants must have a written QC/QA plan for UW Dive inspections

U

Underwater Dive Inspections

Hydrographic Surveys in Lieu of UW Profile Activity

- Hydrographic survey can be completed:
  - On bridges over larger bodies of water where the water stretches across the full span or multiple spans.
  - Locations of bodies of water that are best surveyed using a boat for access.
  - Locations that typical methods of channel survey would be impractical.
  - Locations where monitoring lateral stream migration by review of photographs is not sufficient to ascertain channel condition/movement. Include the global area photographs when the hydrographic survey is completed.
  - When determined by the inspection program manager

U

Underwater Dive Inspections

Underwater Profile Activity

Underwater profile activity and global area photographs up and downstream

- **Underwater profile elevations up and downstream fascia**
  - Sufficient intermediate points between substructure units to adequately determine
    - Top and bottom banks of the waterway.
    - Thalweg of the waterway.
    - Any significant waterway elevation changes.
  - Maximum water depth at each substructure unit in the water.
- **Monitor the lateral movement of the channel up and downstream by the following method:**
  - Review existing arial photographs or satellite views from a web mapping service (ie. Google Maps) to compare to the existing field conditions.
  - Capture up/downstream photographs of the channel and conditions from the bridge deck or channel banks.
    - Enough photos to capture an upstream and downstream view of the entire flood plain; or
    - Overhead photographs up and downstream of the entire flood plain using a UAV (drone).
  - Document any lateral movement or changes in the channel

R

Underwater Dive Inspections

Level of Effort

- All underwater dive inspections include:
  - Level I effort on 100 percent of all underwater elements.
  - Level II effort on 10 percent of all underwater elements.
  - Level III effort as determined by the Team Leader.

R

Underwater Dive Inspections

Dive Logs – Level of Intensities

- “Marine growth present/Cleaned” must be consistent with “Dive Level Intensity”.
- Level II effort requires portions to be cleaned of marine growth.
- Marine growth is not present or cleaning is not performed - Level I completed.
- Dive Logs
  - Level I is completed – mark dive log “No” for marine growth cleaned.
  - Level II is completed – mark dive log “Yes” for marine growth cleaned.

R

Underwater Dive Inspections

Dive Logs

Structure No.:B-[redacted]

Wisconsin Dept. of Transportation
Underwater Bridge Inspection Report/Dive Log
Emxx-01xx Section 84.17 Wis. Statues

This form may be required as a supplement to form EM30-01xx for Underwater Bridge Inspections.

Structure No: B-[redacted]

Inspection Date: [redacted]

Weather Condition.: Sunny 75

Waterline Elev.(ft): 15.9

Safety Concern:

Water Temp.(F): 68

Current (ft/s): 1

Visibility: 6 in to 1ft

Total Inspection Hours: 1
Total Inspection Minutes: 0

Elevation Marker Description: Top of steel rail, at pier, East side.

General Site Condition	
Scour at Bridge Site	Minor at the pier
Embankment Erosion / Conditions	Good
Dive Platform: Shore, Boat, Other	Shore
Location of Boat Access	N/A

One of these is incorrect. If Level II, then marine growth must be present and cleaning must be completed. If no marine growth, then inspection is Level I.

Substructure Unit	Non-Cardinal Abutment	Pier 1
Inspected	X	X
Level of Inspection		Level II
Abutment/Pier Type	SILL WITH BRGS	PILE BENT
Dive Log		
Maximum Water Depth, at Unit (ft)		10.0
Channel Bottom Material, at Unit		Sand
Scour at Unit		Minor
Marine Growth / Cleaning Performed? (Y/N)	N/N	N/N
Debris / Clearing Performed? (Y/N)	N/N	N/N
Mode: Wade,Scuba,Surface Supplied Air:		Scuba
Inspection Comments:		1/4 inch thick pack rust from WL down on all 6 piles. Up to 1/8 inch section loss from nodules.

R

Underwater Dive Inspections

Roles and Responsibilities

- Clearly document roles and responsibilities for entire dive team
  - Inspection report
  - Supplemental forms
  - HSIS

R

Underwater Dive Inspections

Underwater Profiles

- Structures that require underwater dive inspections will have Global area profiles completed at the required dive interval.
- Evidence of channel movement, degradation, or aggradation may necessitate more frequent Global area profiles based on the recommendation of the dive inspection team leader.

N

Complex Feature Inspection

WisDOT Complex Feature Bridges

- NBIS defines complex feature of a bridge as component(s) or member(s) with advanced or unique structural members or operational characteristics, construction methods, and/or requiring specific inspection procedures.
- WisDOT identifies complex features
  - **Mechanical and electrical elements of movable bridge**
  - **Primary cables of a cable stayed bridge**.
- Complex features are subject to specialized inspection procedures, and additional inspector training and experience required to inspect these types of structures.
- WisDOT identifies qualification to inspect cable stayed and movable bridges
  - Primary cables of a cable stayed bridge is to be a TL with NSTM NHI course certificate.
  - Moveable bridge qualifications are described in SIM Part 3.

Closed Bridge Criteria

SIM Section 1.3.15 Establishes Closed Bridge Criteria

A structural condition or deficiency that poses a threat to public safety requires an immediate full or partial closure of the bridge.

Notifications and required actions are listed in the SIM Sec 1.7 Critical Finding Procedure.

Establishes the criteria based on bridge inspection findings and other primary reasons for prompt actions to close a bridge.

Identifies actions to take should a closure be required.

TL, PM and/or bridge owner should be involved in the decision to close a bridge.

If an immediate threat to safety has been identified, the bridge closure or restriction must be completed by any safe means necessary.

Closed Bridge Criteria

Full and Partial Closure Criteria

- Structural Integrity
  - Structural damage or deterioration that compromises safety
  - Inspection finding of safety concern
  - Un-arrested active crack in NSTM which has potential to cause member failure
  - SNBI Component Condition Rating (Item B.C.01-07, 11-15) ≤ 1
  - Results of a Structural Review that recommends closure

- Load Capacity
  - Bridge not capable of carrying a gross live load weight of 3 tons.

Closed Bridge Criteria

Full and Partial Closure Criteria (continued)

- Flood Conditions - closure may be necessary during flood events. Evaluate bridges for safety before reopening to traffic.
  - Flood waters over bridge deck or roadway approaches.
  - Flood waters into the superstructure may necessitate bridge closure to ensure safety.
  - Closure triggers identified in scour critical bridge specific Scour POA.
  - SNBI Component Condition Rating (B.C.09) Channel Condition Rating ≤ 2.

- Emergency Situations - closing the bridge may be necessary to ensure public safety or facilitate emergency response efforts in the case of…
  - Accidents
  - Fires
  - Terrorist threats
  - Natural disasters

Closed Bridge Criteria

Bridge Closure Actions

- The following actions should be implemented when necessary and practical.
  - Call 911 for assistance and notification (when needed). Contact local law enforcement as necessary to assist in setting up closure and detour.
  - Close the roadway over and under the structural elements in question – use vehicles, traffic control devices, or other methods for initial closure. More permanent closure systems and traffic control must be installed in accordance with the MUTCD.
  - Contact owner agency to provide and establish traffic control. Follow the Critical Finding Notification process in SIM Section 1.7.3.2.
  - Bridges over navigable waters –restrict/close the waterway by methods necessary. Notify the US Coast Guard.
  - Bridges over a railroad(s) – contact railroad owner.
  - For state owned bridges, contact the Traffic Management Center (414-227-2166), the RIMC, and region operations/maintenance/traffic section to coordinate appropriate traffic control and detour.
  - Restrict pedestrian access to the structural elements in question.
  - Plan for long term actions.

Signage – Load Posting

- Weight Limit Posting Signs (Assessment 9034): Addition to CS4 guidance…
  - CS4 (Severe) - Sign is absent, or incorrect, or existing sign is damaged or deteriorated to the extent that repair or replacement is required as soon as possible, **no later than 30 days.**
  - Contact the PM or bridge owner as soon as possible to have signage corrected.

- Existing inventory with Weight Limit Posting Signs in CS4:
  - Email will be coming from Alex Pence (WisDOT Load Rating Engineer) to local PMs.
  - Address missing/incorrect/illegible signs
  - Complete Load Posting Verification (DT2122) activity in HSIS when signage is corrected.
  - DEADLINE: **ASAP**

- *CFR 650.313(l)(3) Missing or illegible posting signs shall be corrected as soon as possible but not later than 30 days after inspection or other notification determines a need.*

Specialized Bridge Specific Inspection Procedures

Inspections requiring specialized bridge specific inspection procedures:

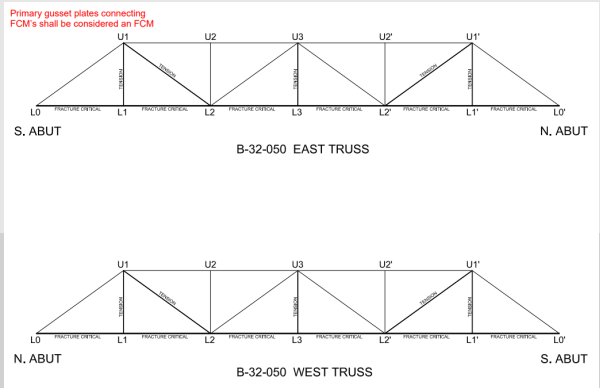
- **NSTM**
- **In-Depth**
- **Underwater Dive Inspection**
- **Complex Feature**
- **Special**
- **Damage**

- Review before the inspection
- Update after the inspection
- References:
  - Manual for Bridge Evaluation (MBE), Third Edition, Section 4.2.5 Inspection Procedures
  - Bridge Inspector's Reference Manual (BIRM), Part 1 Chapter 2 Inspection Fundamentals
  - WisDOT's Structure Inspection Manual

Specialized Bridge Specific Inspection Procedures

Developed to identify information related to the specific bridge based on the inspection type.

- Inspector qualifications - PE, NHI NSTM, NHI dive inspector, electrician for movable bridge, etc.
- Access requirements - Special access needs or equipment necessary
- Equipment needs.
- Scheduling considerations.
- Coordination with agencies and/or partners.
- **Identify members and elements to be inspected as part of the specific inspection**.
- Risk factors - Scour history, existing steel cracks, past mechanical problems, etc.
- Inspection methods and techniques to be utilized and location – Visual hands-on, NDE, etc.
- Inspection interval – including future intervals based on the results of the inspection
- Documentation requirements.
- Safety concerns.
- Reporting and follow-up processes.



Specialized Bridge Specific Inspection Procedures

Include with the bridge inspection report under the Specific Procedures area or as a separate attached document.

BRIDGE INSPECTION REPORT
Wisconsin Department of Transportation
DT2007 2003 s.84.17 Wis. Stats.

page 6 Structure No: **B-12-035**

Assessments

Chk	Element	Defect	Description	UOM	Total	1	2	3	4
	9001		**Drainage - Ends of Structure** SW: NW: NE: SE conc. surface drain with 2 inlets.	EA	4	4	0	0	0
X	9045		**Slope Protection- Riprap**	EA	2	2	0	0	0
	9168		**Concrete Diaphragm** Some spalling in corners over P1 (3 locations) and P2 (2 locations). Heavy efflorescence between deck and diaphragms over P2 and P3.	EA	38	33	5	0	0
	9322		**Approach Roadway - Concrete (non-structural)** [19] Minor spall at south parapet at east abutment.	EA	2	2	0	0	0

(Quantity in Condition State: columns 1–4)

NBI Ratings

	File	New
Deck	7	7
Superstructure	7	7
Substructure	7	7
Culvert	N	N
Channel	6	6
Waterway	8	8

Structure Specific Notes

Snooped in 2014.

Inspection Specific Notes

[19] 62 deg F. The Kickapoo River was high. One foot of pier column #1 was visible and no part of pier column #3 was visible.

Inspector Site-Specific Safety Considerations

Uw-Dive Specific Procedures

Underwater Inspection Procedures: The interim underwater inspection of Bridge B-12-035 (STH 60 over Kickapoo River) was completed on September 23, 2020. The underwater inspection was conducted from a 20 ft boat. The inspection was conducted by a team consisting of two ADCI certified PE-Divers with WisDOT Team leader experience and one engineer diver. The inspection utilized commercial SSA equipment in accordance with OSHA regulations. Soundings were obtained utilizing a continuous recording fathometer operating at 200 kHz and linked to a WAAS enabled GPS receiver.
Current flow conditions can be found at http://waterwatch.usgs.gov. U.S. Coastguard notification is not required for a local notice to mariner's announcement at this bridge since it is not located on navigable waterway per USCG. Local law enforcement was notified for security considerations of the diving operations prior to inspection at: Crawford County Sheriff's Dept. (608) 326-0241.
The bridge elements to be inspected consist of 3 reinforced concrete columns and 1 one reinforced concrete pile cap/footing. According to plans dated 1982, Piers 1 through 3 are founded on steel H-piles however, the 2018 dive inspection found steel heavy walled pipe piles present at undermined Pier 1. Therefore, inspection procedures should follow FHWA guidance and the WisDOT structure Inspection Manual with channel bottom probing to search for bottom of foundations. The routine underwater inspection frequency is recommended to remain at 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.

Special Requirements

Chk Hours Cost Comments

BRIDGE INSPECTION PLAN
B-32-0300
USH 14/61-STH 16, Cass Street Bridge
La Crosse County

Special Inspection – Isolated Activity

- Inspection for localized deficiencies in lieu of Routine inspection
  - When deck, superstructure, substructure, culvert, or scour condition rating ≤ 4.
- Applies when Routine inspection intervals < 24-month.
- Bridge specific PM will determine Routine or Special-Isolated Activity
  - For single span or buried bridges, PM may consider completing a Routine inspection because likely takes similar resources and time.
- In HSIS, select Special Inspection with Isolated Activity.
- Document specialized bridge specific inspection procedures –
  - Outline the scope/reason for the special inspection.
  - Identify the elements and areas being inspected as part of the Special inspection
  - Identify access methods and equipment needed for the Special inspection.
  - Include any inspection recommendations and notify PM of any inspection recommendations.
- Reference SIM 1.3.10.2

R

Critical Findings (CF) Procedure Review

- A structural or safety related deficiency that requires immediate action to ensure public safety.
- The finding must be addressed immediately with proper follow-up and communications.
- For more information, refer to
  - WisDOT's Structure Inspection Manual (SIM) Part 1-Chapter 7

Timelines Related to Critical Findings

- **Timeline to Resolve a CF –** immediate safety concern to the public must be resolved *as soon as possible but no later than 30 days* of the finding.
- **Document in HSIS -** as soon as possible but within 30 days of the CF
- **CF resolved -** does not mean the deficiency has been corrected; it means an action has been taken to address the immediate safety concern.
- **Load posting or change of an existing load posting (Action)** - signage must be installed *as soon as possible, but no later than 30 days* after the determination of the need for the posting; including advanced warning signs installed.
- **Increased monitoring alone** - not sufficient to completely resolve a CF.
- **Temporary repairs alone** - not sufficient to completely resolve a CF.
- **Increased monitoring and temporary repair** – may be sufficient to resolve a CF.

R

Critical Findings Criteria

- Structural Conditions or Deficiencies that pose immediate threat to public safety.
- Deck (BC01), Super (BC02), Sub (BC03), or Culvert condition (BC04) (NBI) ≤ 2
- Channel (BC09) condition ≤ 2
- Scour (BC11) condition ≤ 2
- NSTM (BC14) condition ≤ 3
- Immediate load posting (temporary)

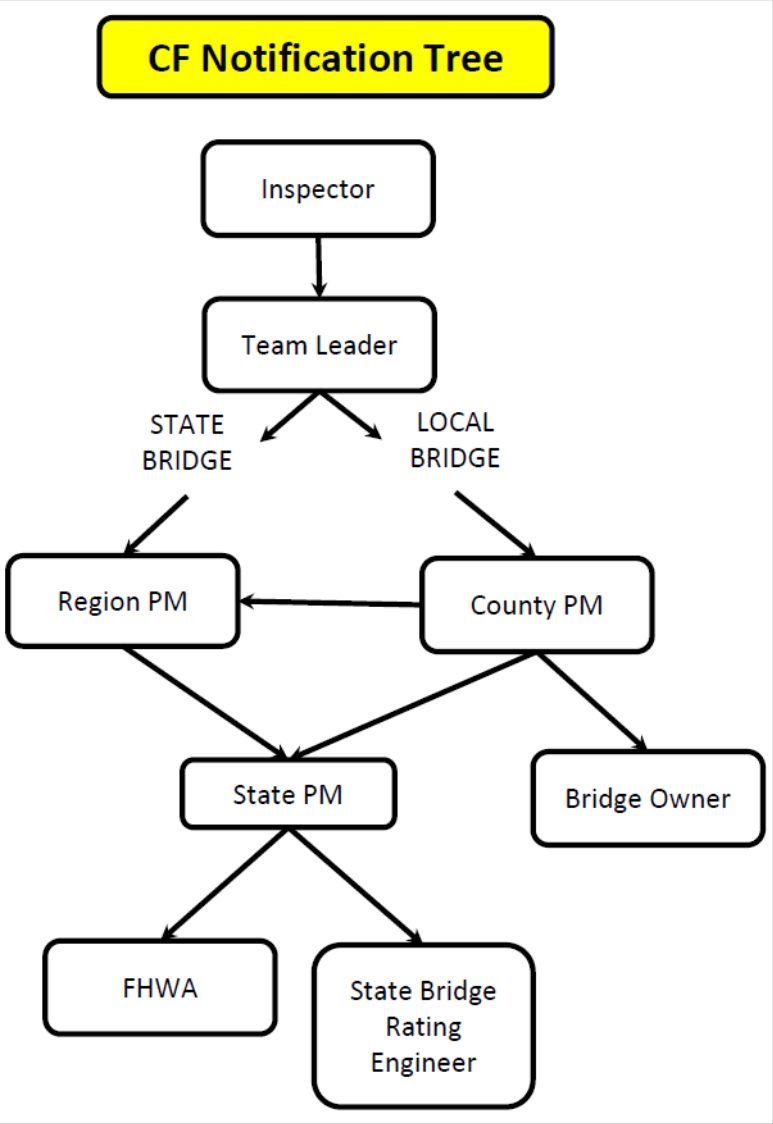
  Instead of a partial or full closure, the inspector, with consultation with the PM, bridge owner, or load rating engineer, decides to immediately post the bridge before an official review or rating is completed.
- Immediate repair including shoring - must be completed in order for bridge to remain open.

  Repair that requires immediate action to ensure public safety.

  Temporary repair does not fully resolve the CF – permanent repair or decreased inspection interval is required.

Notifications for Critical Finding

- **Inspection TL must first address the immediate safety concern.**
- **Notification Tree**
  - TL notifies the bridge's PM (County or WisDOT region).
    - PM notifies the PMs up the line
      - County PM >> Region PM and State PM
      - Region PM >> State PM
      - County PM >> local bridge owner.
  - The State PM will notify FHWA and state rating engineer.
- Notification through direct communication via telephone within 24 hours of CF with an email follow-up is required.
- The TL, PM, owner, and others (as necessary), must determine a plan of action; including any actions to be taken and communication going forward.
- Document the notifications in HSIS on the Critical Findings tab.



HSIS Critical Findings Tab

- Tab in HSIS to document actions taken as a result of the CF.
- Independent of the inspection report which initiated the finding.
- Will remain visible regardless of the status of the inspection
  - Does not disappear once the CF is complete.
  - Future CF are added at the bottom of the tab
- Information needed for the Critical Finding Activity
  - Critical Finding Date
  - Type (drop down menu of CF criteria)
  - Inspector (pre-populated)
  - Close-out inspection required (check box)
  - Critical Finding Description
  - Actions (type, action summary, estimated completion date, and complete date)
    - Numerous actions can be added
  - Notifications - recipient, comment, and date (sent)
    - First notification will prepopulate with the PM
    - Additional notifications with comments about the communication

Critical Finding Action Definitions

- **Temporary** – Action taken to secure the scene while trying to determine the next action. Examples include restricting traffic using temporarily traffic barrels, a temporary repair, or blocking a lane with a vehicle.
- **Underway** – Describe actions that are in progress.
- **Planned** – Describe any planned actions. These can include actions that are the Final-Immediate and Final-Long Term. Other examples could include additional inspections, reduced inspection interval, or repairs being planned/designed.
- **Other** – Describes any action that does not fit into the Temporary, Underway, or Planned action.
- **Final-Immediate** – Select for every CF. Complete once the immediate safety concern has been resolved and the scene is secure- the traffic restriction or bridge closure is in place, the posting signage is installed, and/or a temporary repair has been completed. The PM Review action will appear once the Final-Immediate has a Completed date. If the Final-Immediate action is a permanent repair, it must also be entered as the Final–Long Term action only after the PM has completed the review of the Final-Immediate.
- **Program Manager Review –** the responsible PM must review the actions taken to resolve the Final-Immediate action. Include the name of the reviewing PM in the action summary.
- **Final-Long Term** – Select to identify the final long-term plan. This will generally be a permanent repair, a future bridge rehabilitation, or bridge replacement. A close-out inspection is not required for a bridge rehab or replacement as part of the CF. An initial or special inspection will be completed once the rehabilitation or replacement is completed.

Close-out Inspection

Close-out inspection - a Routine or Special inspection completed to update the condition and inventory data when the final actions include a repair or rehabilitation. Document the following in the close-out inspection:

- Repairs completed – include as-builts plans and photographs
- Update inspection and inventory data items, including condition assessment.
- Traffic control and bridge closure system installed
  - Photographs of signage and closure system
  - Assessment 9036 Bridge Closure System when a bridge is fully or partially closed.
  - Load posting verification (DT2122), when necessary.
- Document the anticipated timeframe of the rehabilitation or replacement.

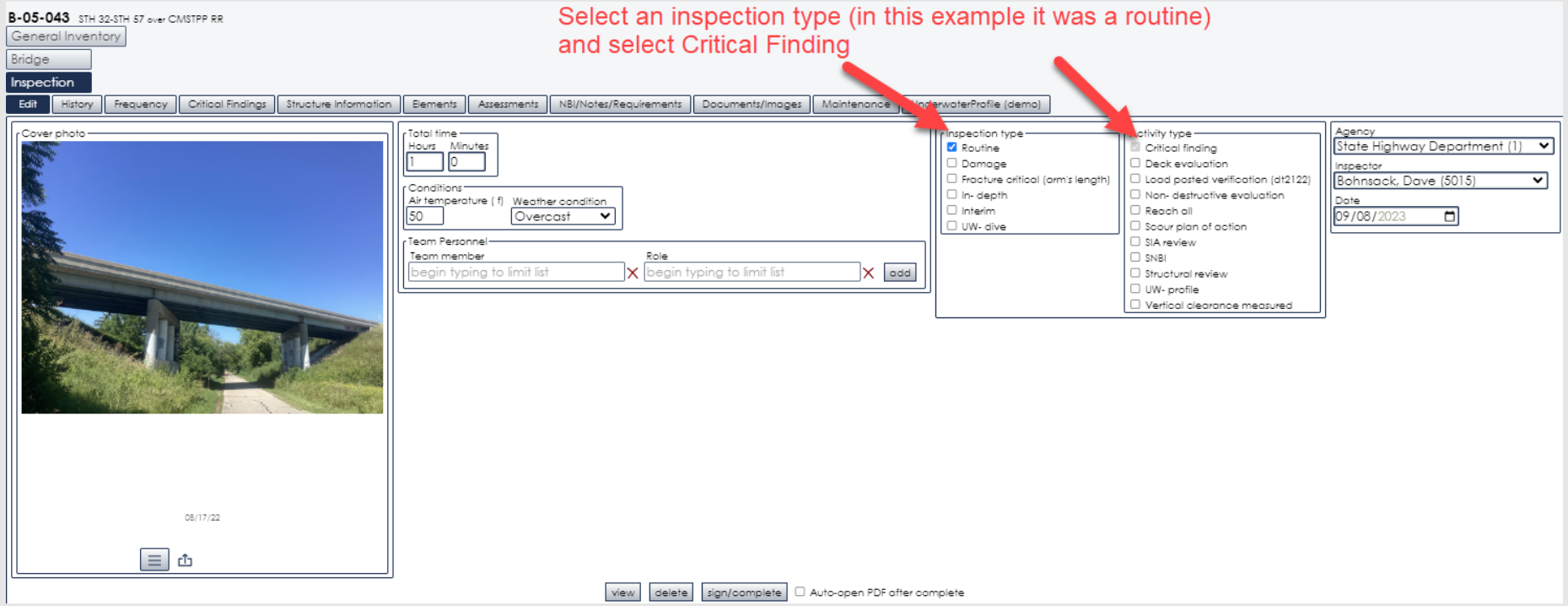
The Critical Findings tab in HSIS has a check box to identify when a close-out inspection is required.

A close-out inspection is **not** required for the following:

1. The Final-Immediate Action and inspection documentation can be included as part of the original inspection report.
2. When the Final-Long Term action is a rehabilitation or replacement of the bridge.

HSIS - CF Tab Example

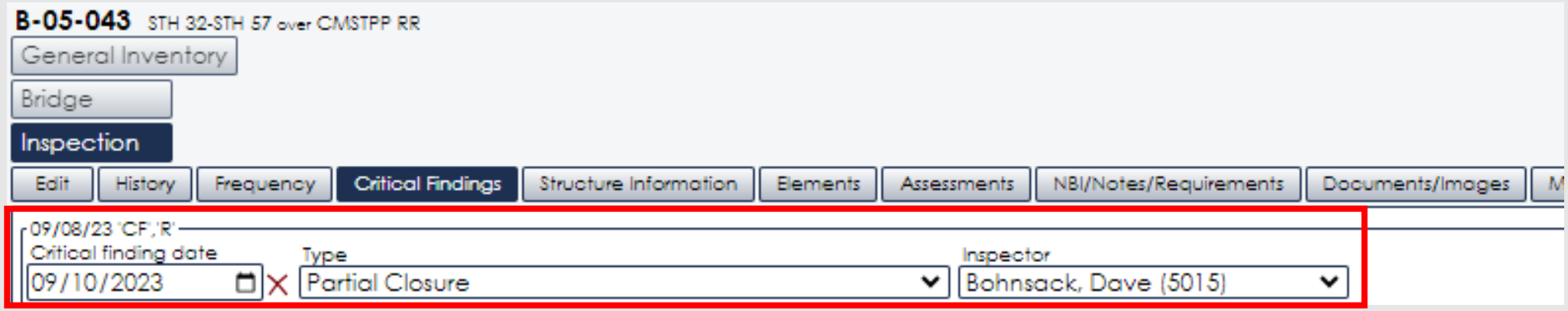
- **Under the Inspection tab, select the Create tab**
- **Fill in the information needed to start an inspection report**
- **Select the inspection type –** inspection which found the CF
- **Select the activity type** – select Critical Finding
- **Select Create**



Screen shot of example CF tab entry in HSIS

HSIS – CF Tab Example

- **Critical Finding Date** – enter the date or select from the calendar
- **Type** – select from the dropdown the criteria met to initiate a CF activity
- **Inspector** – inspector name will be prepopulated from the inspection report

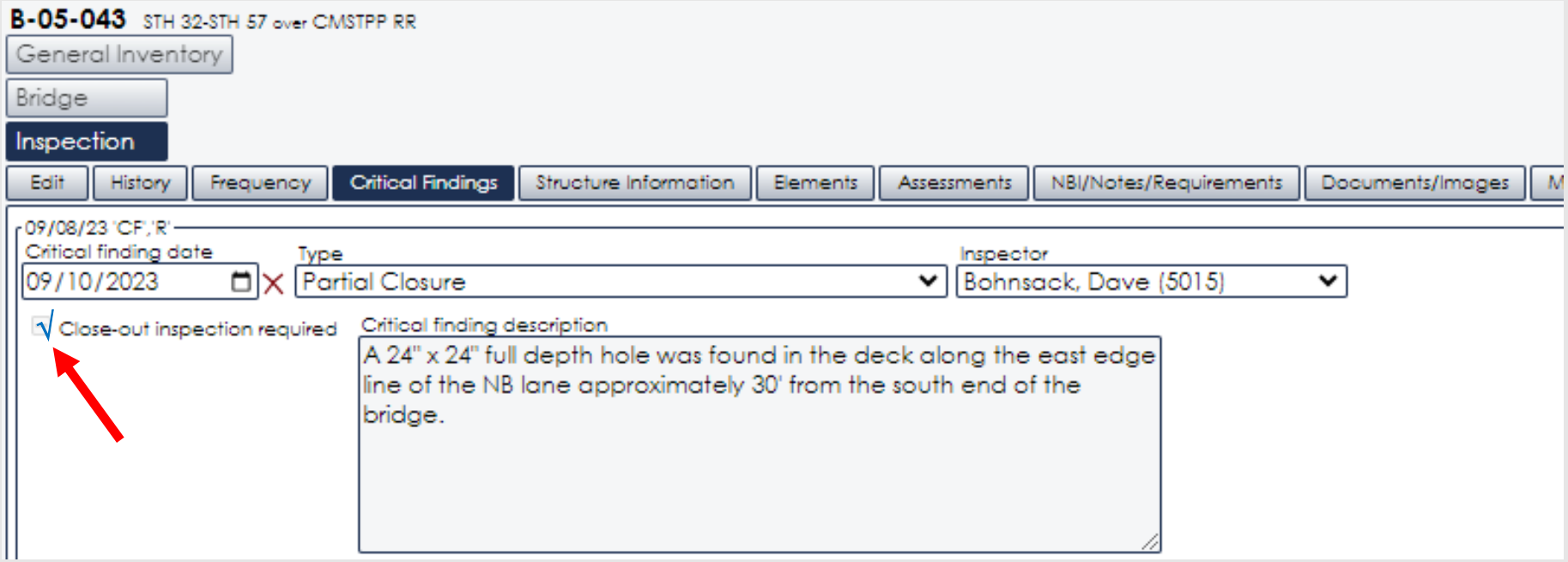


Screen shot of example CF tab entry in HSIS

R

HSIS – CF Tab Example

- **Close-out inspection** - select when it will be necessary to document a permanent repair or permanent traffic control in a different inspection report other than the report that initiated the CF.

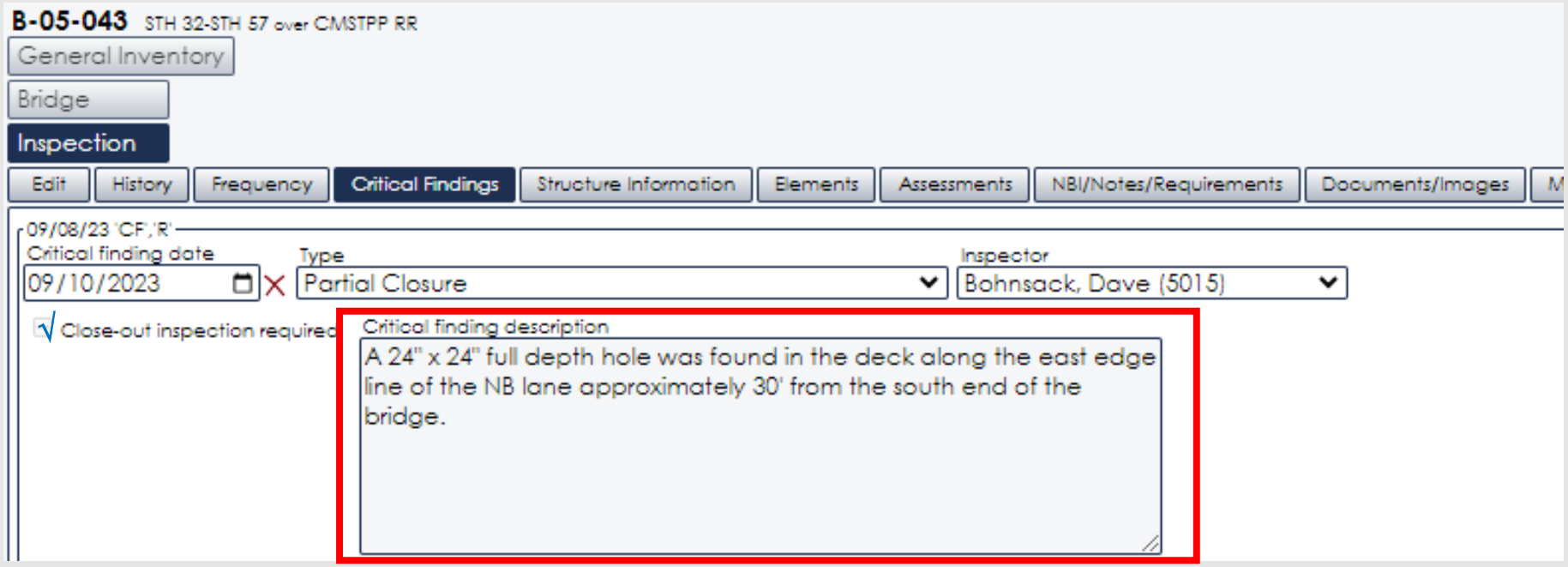


Screen shot of example CF tab entry in HSIS

R

HSIS – CF Tab Example

- **Critical finding description** – provide a summary description of the CF
  - Location, size, and severity of the structural deficiencies that warrant a CF.
  - Information on how the CF was discovered
  - If known, reason for the CF/deficiency.



Screen shot of example CF tab entry in HSIS

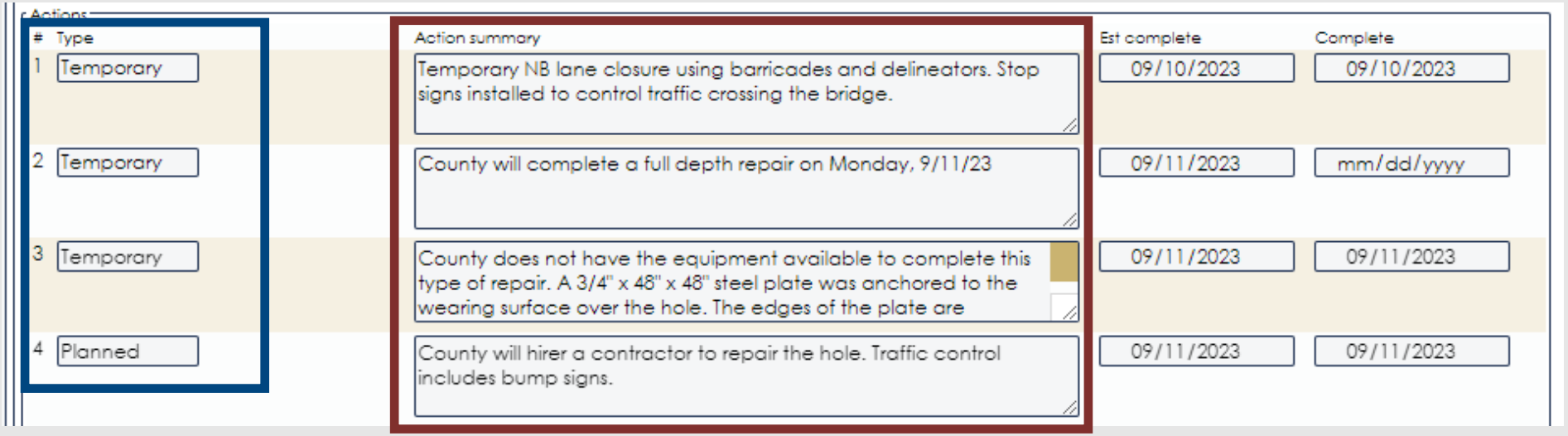
HSIS – CF Tab Example

Critical Findings tab:

Add Actions from dropdown menu

- Temporary
- Underway
- Planned
- Other
- Final-Immediate
- Program Manger Review
- Final–Long Term

Provide a summary of the action.



Screen shot of example CF tab entry in HSIS

HSIS – CF Tab Example

Critical Findings tab: Action Dates

- **Est Complete** – enter an estimated completion date for the action.
- **Complete** – enter the date an action is completed.

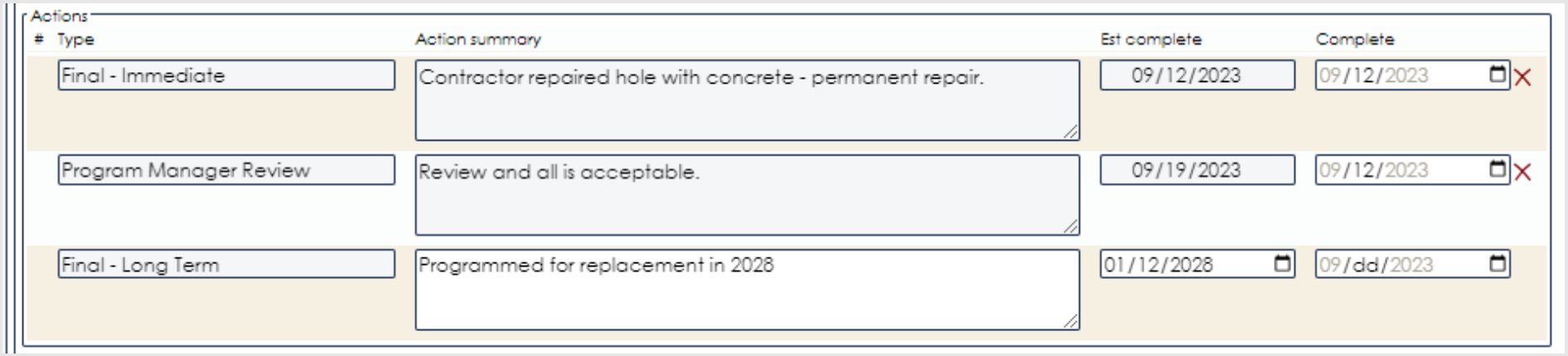
Actions

#	Type	Action summary	Est complete	Complete
1	Temporary	Temporary NB lane closure using barricades and delineators. Stop signs installed to control traffic crossing the bridge.	09/10/2023	09/10/2023
2	Temporary	County will complete a full depth repair on Monday, 9/11/23	09/11/2023	mm/dd/yyyy
3	Temporary	County does not have the equipment available to complete this type of repair. A 3/4" x 48" x 48" steel plate was anchored to the wearing surface over the hole. The edges of the plate are	09/11/2023	09/11/2023
4	Planned	County will hirer a contractor to repair the hole. Traffic control includes bump signs.	09/11/2023	09/11/2023

Screen shot of example CF tab entry in HSIS

HSIS – CF Tab Example

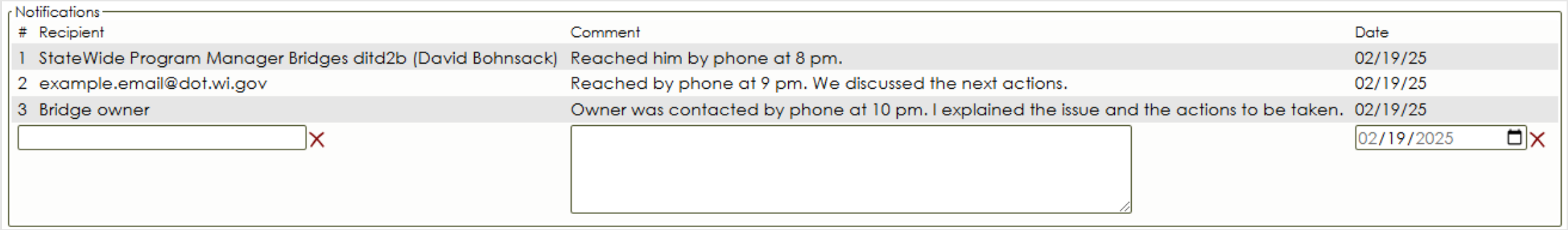
- **Final–Immediate**
  - Must have a completed date before Program Manager Review can be selected.
- **Program Manager Review**
  - Must be reviewed and a completed date before Final-Long Term can be entered
- **Final–Long Term**
  - Long Term and Immediate may be the same if final action is completed as part of the Final-Immediate action



Screen shot of example CF tab entry in HSIS

HSIS – CF Tab Example

- **Notifications** – Document those notified of the CF. The notification is designed to send an email to the individuals in a dropdown list and allows entry of additional email addresses; however, this does not fulfill the direct communications requirement. You must reach them directly by telephone.
- **Recipient** – the PM of record will automatically populate the drop down of the Notifications. Must add a comments and tab or click another area of the box for the **Send** button to appear. Additional recipient lines will appear after Send is selected.
  - A recipient's email address can be added into the box if it does not appear in the dropdown menu. .



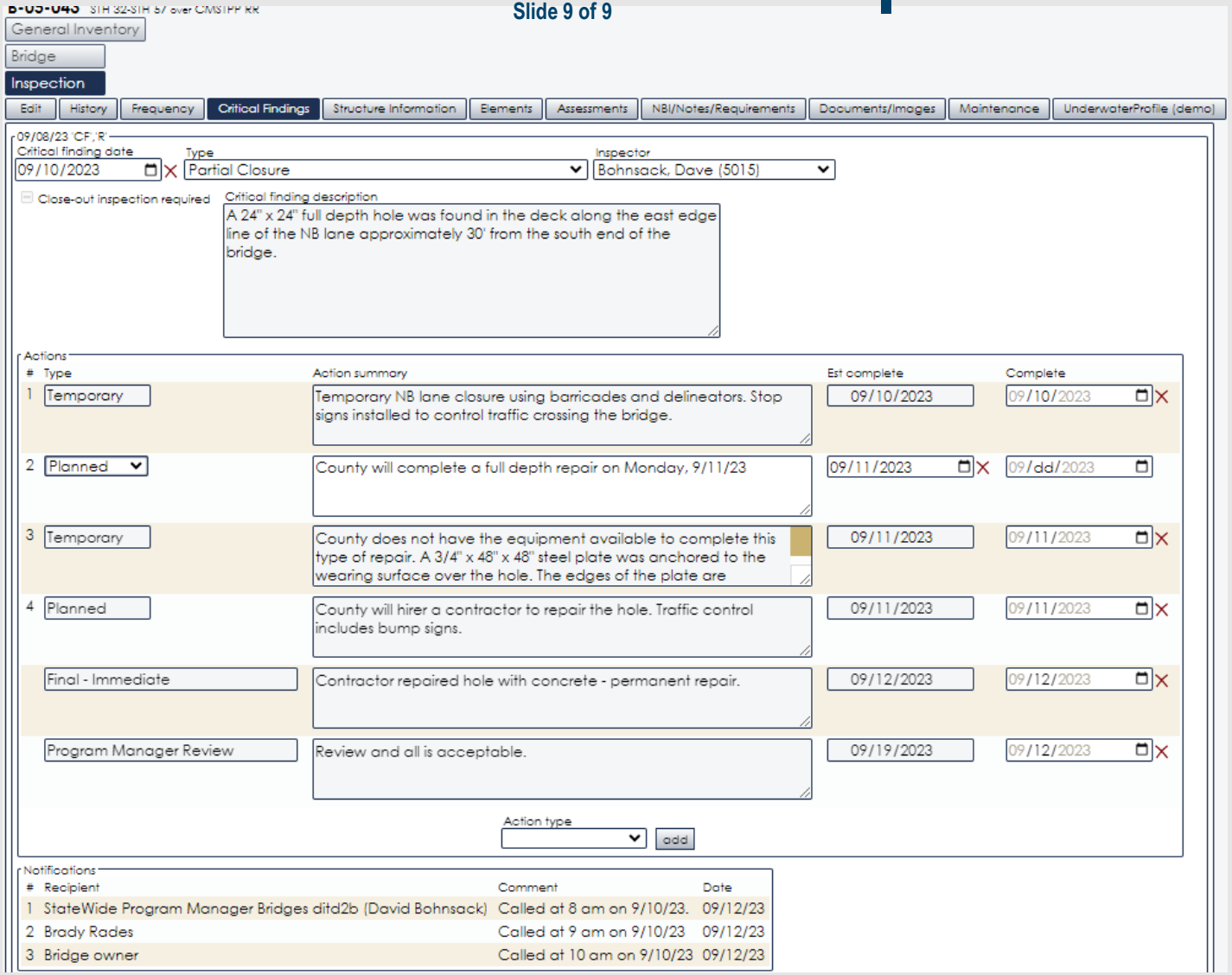
Screen shot of example CF tab entry in HSIS

- **Direct Communication Responsibility notice** – warning will appear notifying that direct communication with the recipient is required.

Message notifying requirement of direct communications.

HSIS – CF Tab Example

Completed Critical Findings tab in HSIS



Screen shot of example CF tab entry in HSIS

Measuring Overburden Depth

Always check Overburden depth on inspection report to verify accuracy.

Accurate overburden measurements are necessary to provide better load rating accuracy.

Bridge safety can depend on the amount of overburden on a bridge.

Recommendation to local PMs –

Prior to inspection season, when communicating with county highway commissioners, townships, or municipalities, ask about any planned projects that may pave over bridges decks.

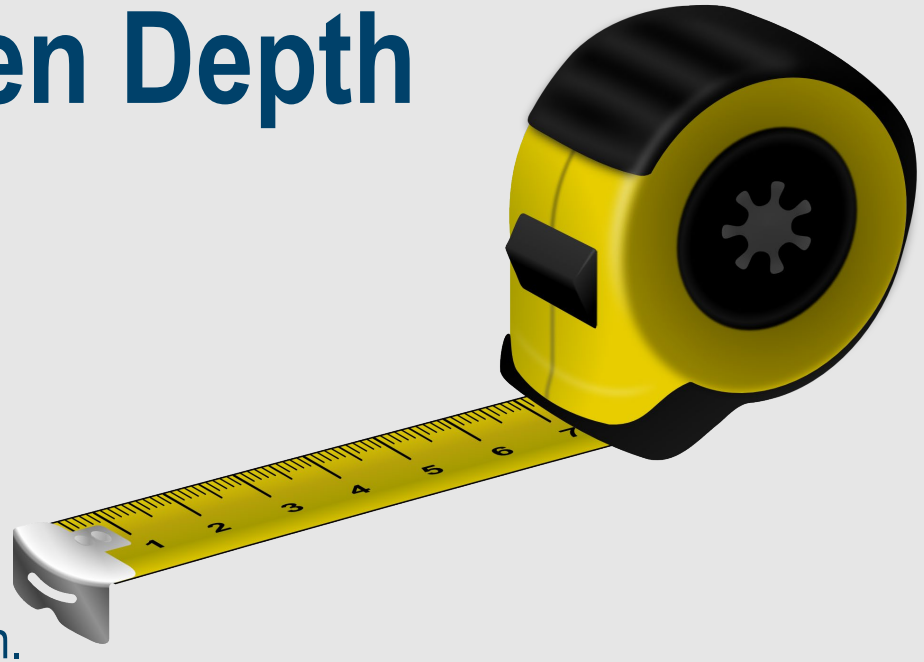
Request that bridge owners notify local PM when a bridge is paved over or additional overburden is added.

Document in the inspection report:

- Wearing Surface Element – include additional notes about the overburden
  - Date the measurement was completed
  - Location the measurement was taken.
  - Any notes clarifying how the overburden was measured or determined.

U

Measuring Overburden Depth



- Obtain multiple measurements –
  - Average the overburden measurement.

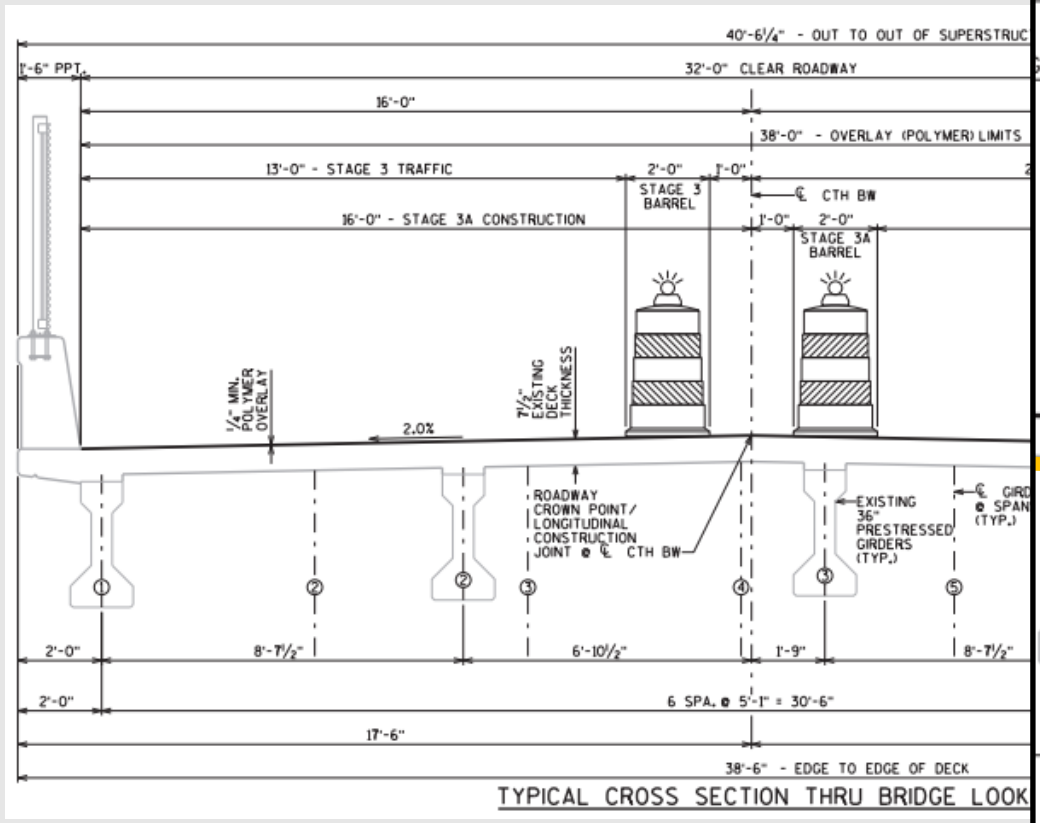
Methods for finding or determining overburden depth.

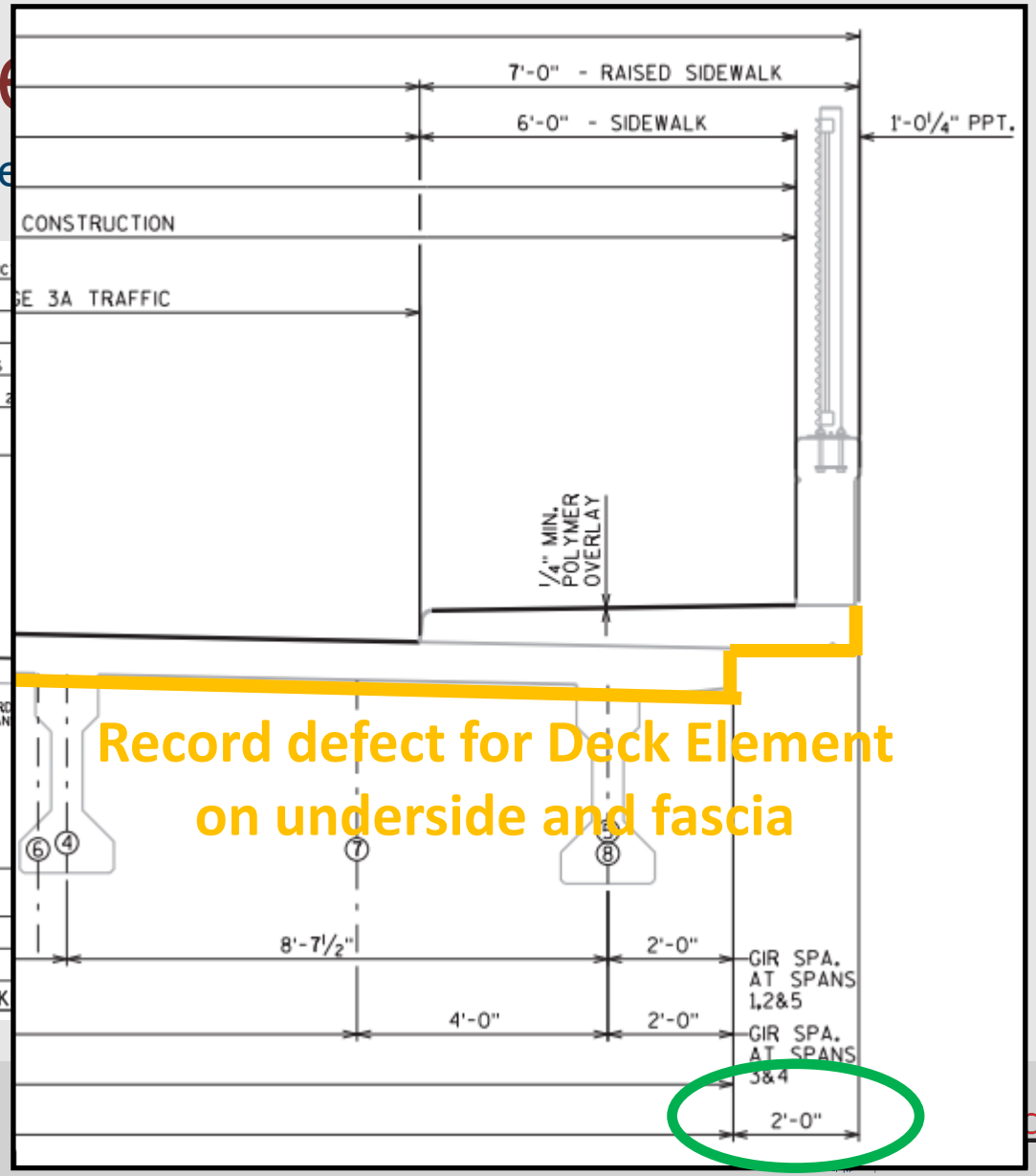
- Review as-built plans if available.
- If deck drains are visible, measure inside deck drains
- Measure from top of curb or rail when curb or rail height is known.
  - If no plan is available, look for plan for a similar bridge in the area.
- Remove shoulder or approach material just off the end of the bridge to expose a section of the overburden.
- Pound pin in surface (best for base course but might work with some poor condition AC overlays)
- Drill a small hole with a masonry drill bit/cordless drill and use pin, nail, or rod to check depth. Should have a tube of caulk or roofing tar to fill in hole.
- GPR
- Other

Overhanging Sidewalk and Median

8209 R/I Concre

New deck width for inspection = 38.5’ edge to edge of de

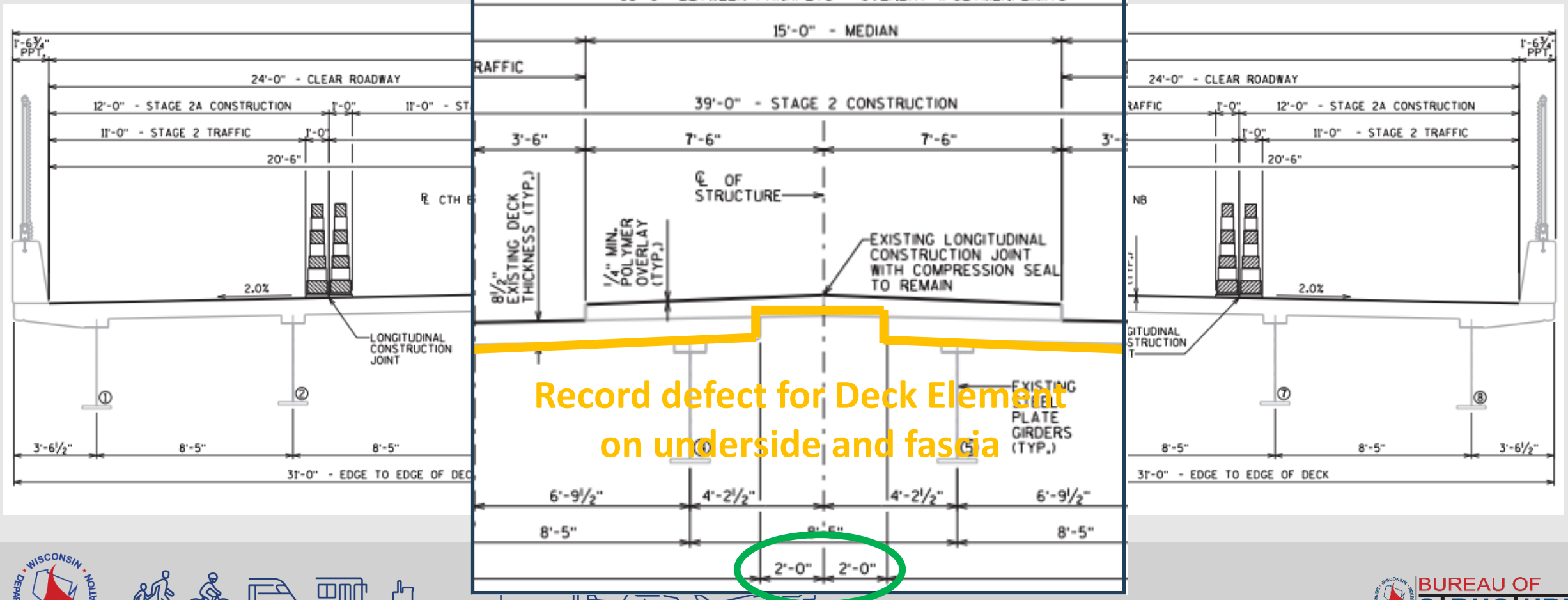




Overhanging Sidewalk and Median

8207 R/I Concrete Median

New deck width for inspectior overhang = 66.2’



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Overhanging Sidewalk and Median

8207 R/I Concrete Median & 8209 R/I Concrete Sidewalk

1. Calculate and add the area of overhanging sidewalk & median to the deck/slab element for each bridge
2. Quantify and include with the deck/slab element all defects in the exposed underside and fascia of a sidewalk and underside of the median.
3. Quantify defects in the top surface and curbed faces of the sidewalk and median under the new agency defined elements sidewalk (8209) and median (8207) by SF.

Guidance for the Field Manual and SIM:

The quantity for deck and slab will be edge to edge including any sidewalk or median areas, flares, and ramps. The evaluation area will include the bottom surface and fascia.

Do not consider the sidewalk or median condition in the (NBI) rating for Deck Condition Rating, except insofar as they impact the condition of the deck/slab itself.

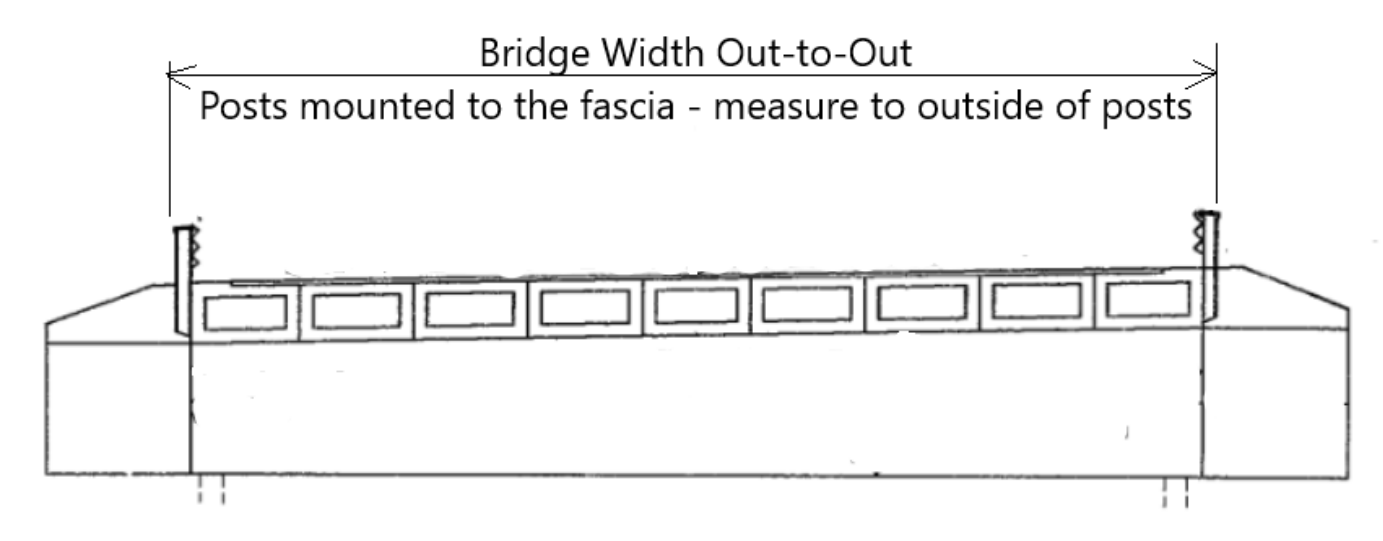
ie. a full depth sidewalk patch extending into the deck/slab.

SNBI Item Clarification

Bridge Width Out to Out (Item B.G.05) - bridges with fascia mounted railing

Minimum out-to-out width measured perpendicular to the C/L of the roadway to the nearest tenth of a foot.

Measure to the outside of posts for fascia mounted rail.

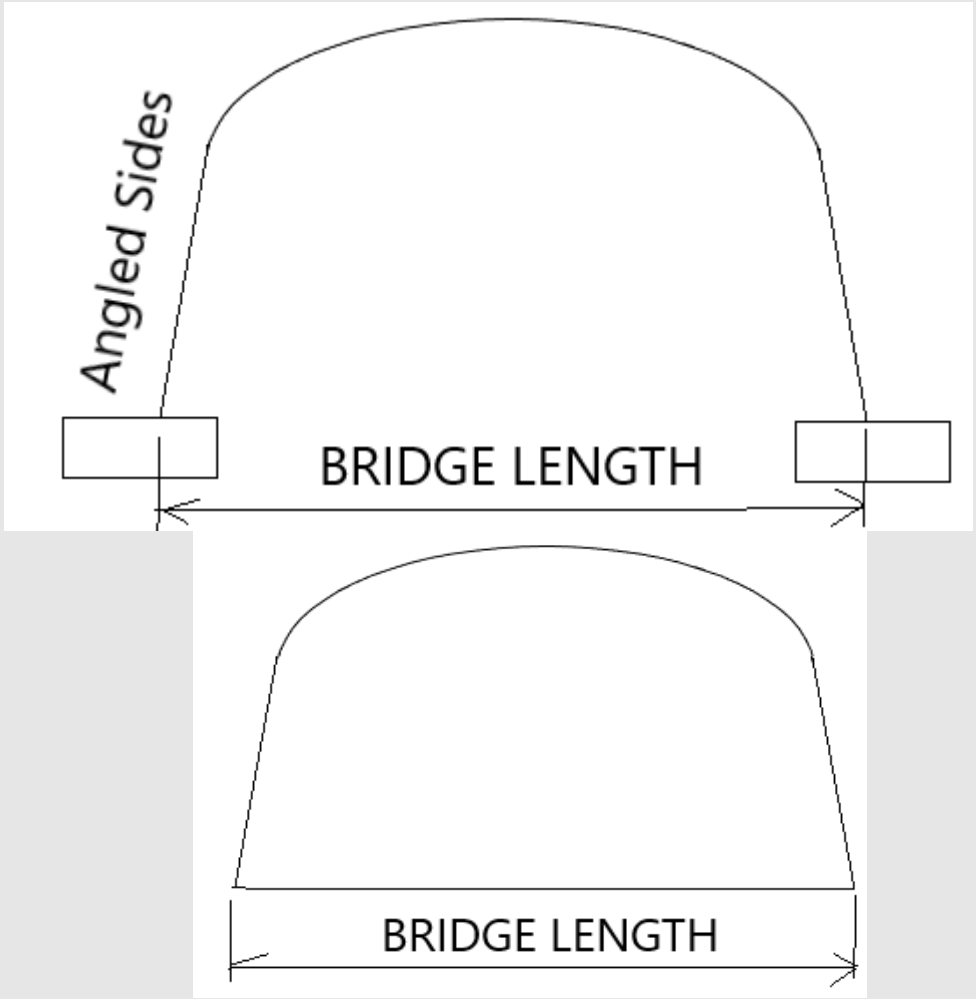


Structure with Angled Sides

B.G.02 Total Bridge Length

- Arch Shape
  - Measure at the base or spring line.
  - Measure from inside faces of exterior spring lines when well-defined backwalls do not exist.

- Pipe
  - Line of the outermost points on the sides
  - Maximum horizontal dimension



3-Sided Frame Bridges – Not Arches

3-Sided Frame Bridges – Not Arches

- WisDOT has incorrectly coded some arch shaped precast structures –
  - *Email on subject sent to all inspection PMs on 8/29/2024 with list of existing bridges*
- Some arch shaped structures are 3-sided rigid frame buried bridges.
- Most are Contech Con/Span B-series structures, or similar.
- Many were coded Span Type (B.SP.06) *Arch – closed spandrel (A03)*
  - Miscoding leaves them ineligible for a 48-month inspection interval per the SNBI.

- **Existing Bridges -**
  - Revise the AASHTO elements.
  - Measure and update element quantities.
  - Review and update the NBIs. Arches already require superstructure and substructure condition rating (some may have had a deck NBI).
    - Culvert NBI should not be used for arches, however, some of these structures were previously coded as a culvert span type, so those might still have culvert NBI that need to be corrected.
- **New Bridges –**
  - Correctly code the elements and SNBI items during initial inspection
  - Most are installed under local let projects or by county crews.
  - Region PMs if made aware of a structure being installed, please inform local PM/inspector

Number of Beam Lines

SNBI Item SP.03

Bridges with girders that come into the side of another girder

-SNBI guidance indicates SP.03 is the number of **main** longitudinal load carrying members; therefore, do not count short intersecting girders that are not longitudinal load carrying.

-Use the average number of beam lines for bridge with variable number of beam lines within a span configuration, rounded down.

Number of Beam Lines for box culverts (4 sided frame) with multiple barrels:

-Report = 1 regardless of the number of barrels.

U

Buried Bridges – Structures Under Fill

Culverts, 3 & 4 sided rigid frames, closed spandrel arches, arches w/o spandrels

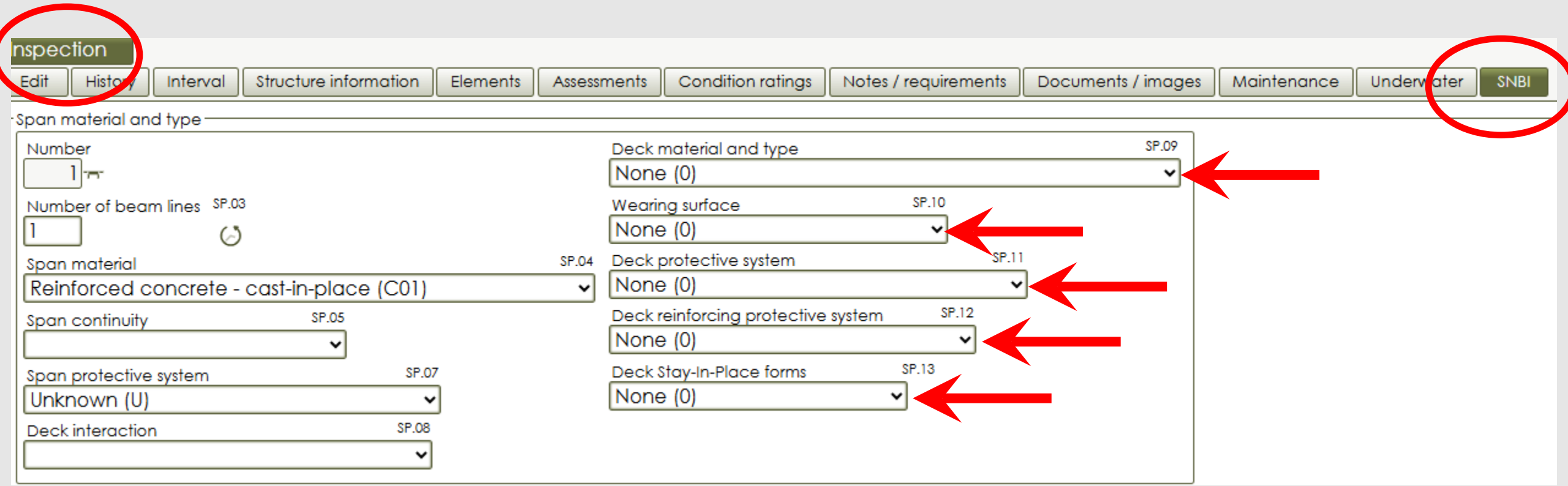
Code **NONE (0)** for structures under fill for SP.09 thru SP.13:

- B.SP.09 Deck Material and Type
- B.SP.10 Wearing Surface
- B.SP.11 Deck Protective System
- B.SP.12 Deck Reinforcing Protective System
- B.SP.13 Deck Stay-in-Place Forms

U

Buried Bridges – Structures Under Fill

SNBI Item B.SP.09 thru 13



U

Span Protective System

SNBI Item SP.07

- Concrete slab bridges without an overlay would be coded C02 (sealer).
- For existing in-service concrete bridges, unless the owner has easily accessible records, code U - Unknown.
- Only admixtures for waterproofing or corrosion protection are recorded.
- P/S beams have a spray coating - Code C02 if known to be used.
- Code U for concrete that has unknown admixtures or sealers.

N

Deck Protective System

SNBI Item SP.11

SNBI guidance is unclear, FHWA has indicated the deck sealer/methacrylate placed on a concrete overlay can be coded as the Deck Protective System.

OLD - Sealer or methacrylate on a concrete overlay is not the protective system for the deck

Code 0 - None

NEW – Sealer or methacrylate on a concrete overlay is the protective system for the deck

Code either C02 – sealer or C03 - methacrylate

2.1 – SPAN MATERIAL AND TYPE

Deck Protective System

Format	Frequency	Item ID
AN (3)	I	B.SP.11

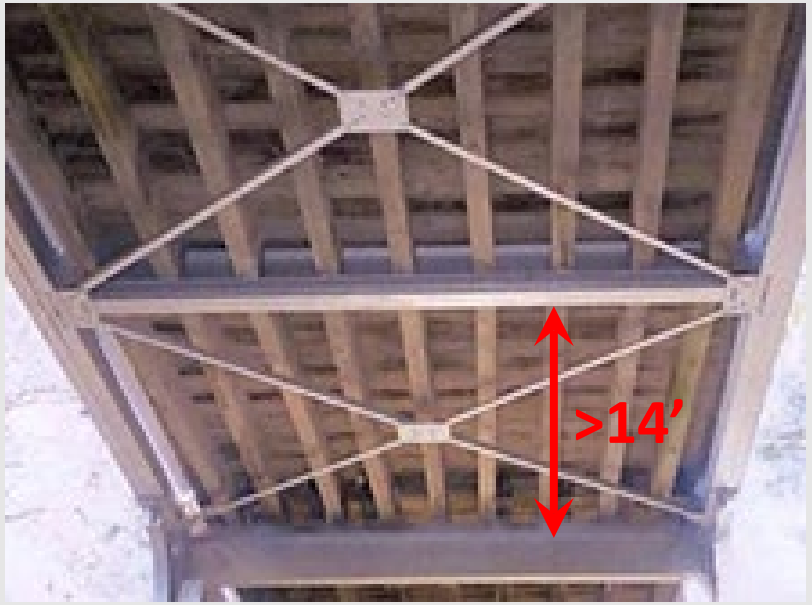
Specification	Commentary
Report the deck protective system for the span configuration using one of the following codes. Code – Description 0 – None A01 – Admixture – internally sealed A02 – Admixture – low permeability A03 – Admixture – polymer impregnated A04 – Admixture – corrosion inhibitor A05 – Admixture – ASR inhibitor AX – Admixture – other C01 – Coating – paint C02 – Coating – sealer~~silane/siloxane~~ C03 – Coating – methacrylate C04 – Coating – hot dip galvanizing C05 – Coating – metalizing/thermal spray CX – Coating – other M01 – Membrane – built up M02 – Membrane – sheet M03 – Membrane – liquid applied MU – Membrane – unknown MX – Membrane – other P01 – Patina – uncoated weathering steel T01 – Treated – timber preservative U – Unknown X – Other Do not report this item when Item B.SP.09 *(Deck Material and Type)* is 0.	Code this item consistent with the predominant material reported in Item B.SP.09 *(Deck Material and Type)*. In cases where the deck may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer. Use code 0 when the deck is unprotected~~there is no known internal or external protective system in place~~. Use code A01 for internally sealed concrete systems that use wax beads in the concrete. After the concrete cures, it is heated to melt the wax and seal the concrete. Use code A02 when low permeability concrete is used with admixtures such as flyash, microsilica, or slag. Use code A05 when admixtures are used to inhibit alkali-silica reactivity (ASR). Use code C02 for sealers such as silanes, siloxanes, linseed oils, etc. Do not use codes C02 and C03 when the material is applied for localized crack repair. Use code M01 when the membrane is built up using combined layers of liquid and preformed/sheet membranes. Use code MU when a membrane exists, but the type is unknown. Use code MX when a membrane type is known, but does not match the types specified for codes M01, M02, or M03.

R

Floorbeams = Spacing > 14’

SIM 1.3.5 NSTM Inspection

- **Requires a hands-on inspection** for the entire tension portion of the floorbeam.
- Applies to connections located in tension zones, such as the floorbeam connection(s) to the primary load carrying member and connections to secondary members such as stringer to floorbeam.
- Note in the bridge specific inspection procedures and on NSTM drawing, if NSTM bridge.
- NSTM inspection interval.
- Certified NSTM inspector.
- Hands-on inspection is not required if approved FHWA analysis shows FB is non-critical.



Structural Review for NBI CS4

CS4 guidance is found in the beginning of each material section in Field Manual.

Condition State 4 (Severe) - Steel

The items listed below are common situations that would **require** a structural review for **primary structural elements**. This list is not exhaustive; there are situations other than what is listed below that may need a review. It is the responsibility of the inspector to elevate these less-common situations, in addition to the conditions listed below, as is deemed necessary.

Primary Superstructure (102 thru 162, 8165, 8170) & Substructure (202 thru 231) Elements

- Corrosion (1000)
  - High-shear areas where the average loss of the web exceeds 10% of web thickness or where corrosion holes exist.
  - High-moment areas where the average loss of the flange exceeds 10% of the flange thickness.
  - Tension members where the section loss exceeds 10% of the gross cross-sectional area.
  - Compression members of arches or trusses where the section loss exceeds 10% of the gross cross-sectional area.
  - Piles or columns where the section loss exceeds 15% of the gross cross-sectional area.
- Cracking (1010)
  - Unarrested cracks in NSTM members
  - Unarrested cracks in flexural members that exceeds 3" in length or a crack that has grown since the last inspection
- Connection (1020)
  - Missing bolts or rivets in fracture critical members
  - Members where more than 10% of the connection assembly (welds, fasteners, etc.) are missing, loose or cracked.
- Distortion (1900)
  - Compression members that are severely bent, bowed or distorted.
  - Members that have been bent, bowed, or distorted due to impact.

Primary Culvert (240) Element

- Corrosion (1000)
  - Loss of section where perforations exist throughout the pipe.
- Connection (1020)
  - More than 10% of the fasteners are missing, cracked or heavily deteriorated.
- Distortion (1900)
  - Distortion along the length of the culvert in excess of 15% difference from the design dimensions or if the distortion has changed significantly since the last inspection.

R

Wearing Surface Elements

Field Manual Chapter 3.J - pg. 103 & Chapter 6.E - pg. 173)

- 8509 – Asphaltic Chip Seal
  - A spray applied asphalt binder embedded with aggregate chips
- 8510 – HMA (AC) Overlay with Sheet Membrane
  - A flexible hot mixed asphalt overlay placed on a waterproofing sheet membrane
- 8512 – HMA (AC) Overlay with Spray Membrane
  - A flexible hot mixed asphalt overlay placed on a spray applied waterproofing membrane

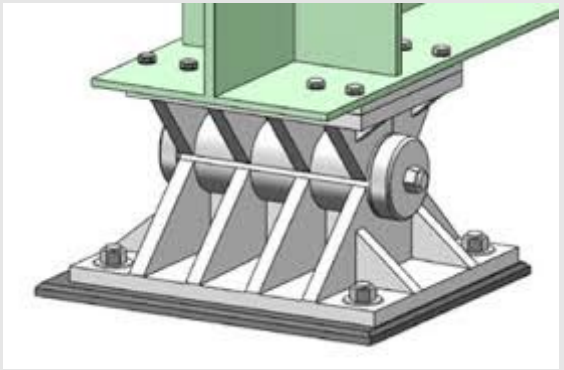
__Note__ - Methacrylate deck sealer itself is not a wearing surface element

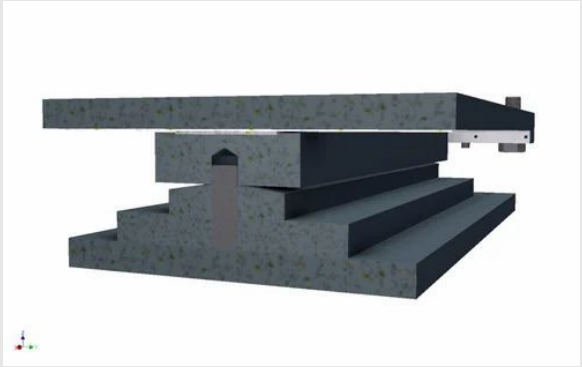
Bearing Elements

Fixed Bearings (Element 313)

Guidance from the field manual:

- **Bearings - Fixed (Element 313)** – *This element defines only those bridge bearings that provide **for rotation only** (no longitudinal movement).*





Bearing Elements

Steel Girder Plate - Not a Bearing

- Plate condition should be captured in the narrative under the **primary superstructure element**.
- Bridges abutments or pier caps with a steel cover plate the girder is set on, this plate is considered part of the **substructure**, and its condition should be included with the steel abutment/pier cap.

R

Bearing Elements

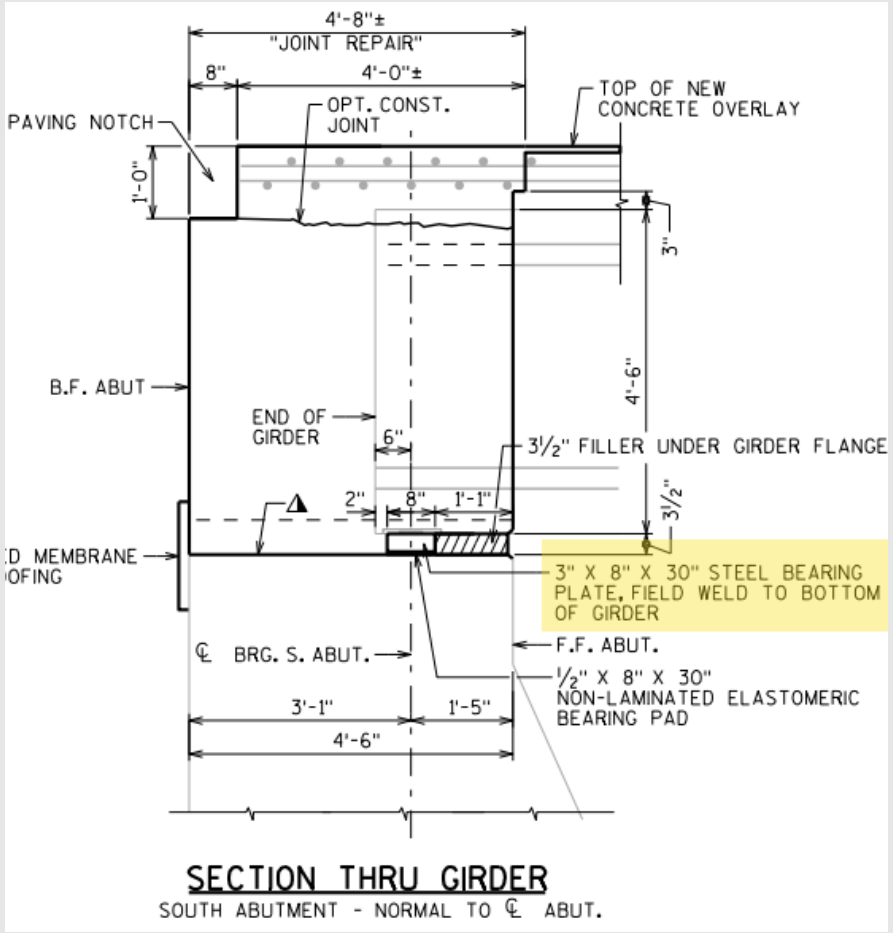
Thin Elastomeric Bearing Pads

WisDOT's long-standing inspection policy –

- Thin elastomeric bearing pads (1/2" to 1" thick) installed under girders are not assessed as a bearing element.
- Assessed as part of the superstructure element.
- SNBI Item B.C.07 Bridge Bearing Condition Rating reported as "N" (not applicable).
  - SNBI Commentary notes in cases where the bearing device is not visible, the condition can be assessed based on indirect indicators. For these pads, WisDOT does not recognize them as a bearing element, so N is appropriate.

Bearing Elements

Enclosed/Concealed Bearing (Element 312) NEW



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Bearing Elements

Enclosed/Concealed Bearing (Element 312) NEW

Description: *Bridge bearings that are enclosed so that they are not open for detailed inspection. This element should be used for bearings that cannot be inspected.*

Guidance: *The inspector shall assess the condition based on alignment, grade across the joint, persistence of debris, or other indirect indicators of the condition.*

Examples of visual cues: *The front edge of the abutment sheared off just under the girders, the superstructure/deck raised higher than the approach pavement, elastomeric bearing pads walking out, etc. If no visual signs of issues, code CS1.*

Unit of Measure: *EACH*

N

Bearing Elements

Defects for Enclosed/Concealed Bearing (Element 312) NEW

Defect	CS 1 GOOD	CS 2 FAIR	CS 3 POOR	CS 4 SEVERE
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or bridge; OR a structural review has been completed and the defects impact strength or serviceability of the element or bridge.
Movement (2210)	Free to move.	Minor restriction.	Restricted, but not warranting structural review.	
Alignment (2220)	Lateral and vertical alignment is as expected for the temperature conditions.	Tolerable lateral or vertical alignment that is inconsistent with the temperature conditions.	Approaching the limits of lateral or vertical alignment for the bearing but does not warrant a structural review.	
Loss of Bearing Area (2240)	None.	Less than 10%.	10% or more but does not warrant structural review.	

N

Buried Structure Bridge Railing

Add Element for Bridge Railing to Buried Structures NEW

Elements: *330 Metal Bridge Rail –*

W rail, thrie beam, and cable guard type rail

331 R/I Concrete Bridge Rail –

Concrete barrier wall

332 Timber Bridge Railing

333 Other Material Bridge Railing

334 Masonry Bridge Railing

From SNBI commentary for B.C.05 Bridge Railings Condition Rating:

Do not consider pedestrian railings when coding this item, except to the extent that the pedestrian railing is integral to the traffic barrier.

SNBI Table 20

Use Table 20 to determine condition rating codes for the bridge component items in this section (Items B.C.01 through B.C.07) The entire code description must be satisfied for the code to apply.

Table 20. Codes and descriptions for component condition ratings.

Code	Condition	Description
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

Semicolon = AND

N

WisDOT Field Manual Table

Use Table 20 to determine condition rating codes for the bridge component items in this section (Items B.C.01 through B.C.07). The entire code description must be satisfied for the code to apply.

Table 20. Codes and descriptions for component condition ratings.

Code	Condition	Description
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects
8	VERY GOOD	Some inherent defects, *or isolated minor defects*.
7	GOOD	Some inherent defects, *or isolated minor defects*; strength and performance of the component are not affected
6	SATISFACTORY	Some *or widespread* moderate defects, *isolated major defects*; strength and performance of the component are not affected
5	FAIR	Some *or widespread* moderate defects, *isolated major defects*; strength and performance of the component is affected.
4	POOR	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
3	SERIOUS	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
2	CRITICAL	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
1	IMMINENT FAILURE	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.
0	FAILED	

NEW
WisDOT guidance

Modified Quick Assessment Chart SNBI Table 20 from Field Manual

Updated with new WisDOT guidance

SNBI Table 20 Expanded④			SEVERITY①				
	Code②	Condition	INHERENT (CS1)	MINOR (CS2)	MODERATE (CS3)	MAJOR (CS4)	STRENGTH & PERFORMANCE AFFECTED ③
GOOD	9	Excellent	Isolated				
	8	Very Good	Some	*Isolated*			
	7	Good		Some			
FAIR	6	Satisfactory		Widespread OR Isolated			
	5	Fair			Some *or* *Widespread*	*Isolated* AND	NO
POOR	4	Poor			Widespread OR	Isolated AND	YES *12 MO INTERVAL*
	3	Serious					SERIOUSLY *AFFECTED <12 MO INTERVAL*
	2	Critical					COMPONENT *COMPROMISED <6 MO INTERVAL*
	1 & 0	*BRIDGE IS CLOSED. 1 = may return to service, 0 = replacement is required.*					

① *Refer to SNBI item commentary and Appendic C for rules and clarification.*
② *The whole description must read true for the code to apply.*
③ *Strength and performance determined by Structural Review criteria.*
④ *SNBI Table 20 governs for any conflict with this SNBI Table 20 Expanded*

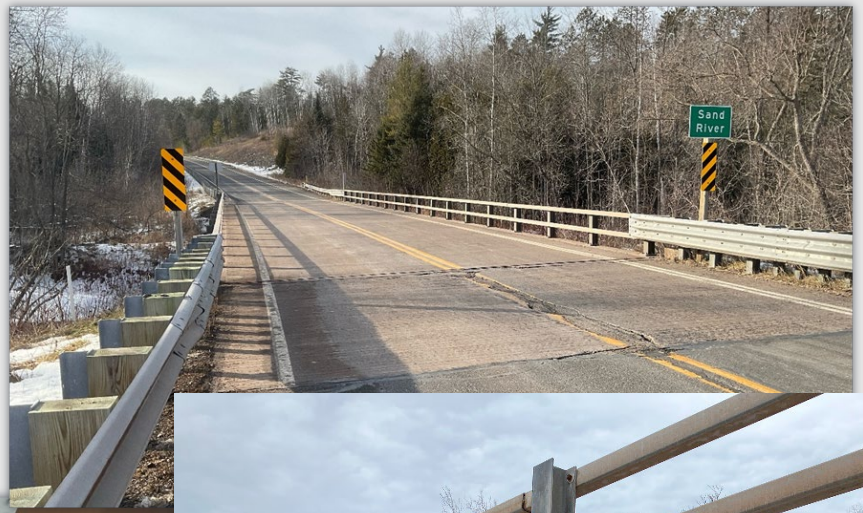
N

Defect Extent Guidance

Extent	Quantity (SF & LF)
Isolated	≤ 5%
Some	> 5% to 20%
Widespread	> 20%

- Correlates well with SF and LF defect quantities.
- Not so well with steel cracking or steel distortion.
- Use inspector judgement when reviewing quantities.

Example: Deck Condition



N

Example: Deck element & wearing surface (bare) condition

Structural Review

Action

Action Plan:	Created:	Due:
Structural Review	24-Apr-2023	19-Jun-2023

Overall Notes:
Abutments under G5 (both ends of bridge) have significant concrete deterioration. G5 bearing has roughly 15% loss of bearing area. The remaining concrete under the bearing appears to be solid.
Area will be monitored during subsequent yearly inspections until the repairs are finalized. LET in 2025.

Reviewer:	Reviewer PE Number:	Review Method:
Mc [illegible]	[illegible]	engineering judgement

Element	Required Reason	Note
Reinforced Concrete Abutment	increase in CS4 quantity	Abutments under G5 (both ends of bridge) have significant concrete deterioration. G5 bearing has roughly 15% loss of bearing area.

Final Action: No Action Required

Final Action(s) Complete:	Late Reason:	Late Reason Status Notes:
24-Apr-2023		

Elements

Chk	Element	Defect	Description	UOM	Total	Quantity in Condition State 1	2	3	4
X	12		**Reinforced Concrete Deck - Coated Reinforcing**	SF	4,005	**3,208**	**710**	**32**	**55**
			Delamination - Spall - Patched Area	SF		0	**50**	**32**	**55**
		1080	3'x2' spall in SW corner. Patched in 2022 but unsound **(6SF CS3)**. 1'x1' spall in SE corner. Patched in 2022 but unsound **(1SF CS3)**. **South Fascia:** **Deck edge over Pier 1 exhibited full depth spalling 13FT L x 1FT W, exposing 42 transverse bars and 3 longitudinal bars with up to 5% section loss (13SF CS4).** **Deck edge under rail post 3W exhibited full depth spall 2FT L x 4IN W (2SF CS4).** **Deck edge from midspan of span 2 to east abutment has approximately 40FT of spalling up to full depth and 1FT wide, with a few dozen exposed transverse bars and multiple exposed longitudinal bars exhibiting up to 15% section loss. Most extensive spalling from Pier 2 extending east 20FT (40SF CS4).** **Remaining south fascia exhibited delamination or spalling with exposed rebar (50SF CS2, 25SF CS3).**						
			Cracking (RC)	SF		0	660	0	0
		1130	S1 - 10 transverse cracks (300SF CS2). S2 - 8 transverse cracks with efflorescence (240SF CS2). S3 - 4 transverse cracks (120SF CS2). CL Joint leaching with eff under.						
			Discoloration	SF		**0**	**135**	**205**	**200**
			South deck edge, outside G5 exhibited moderate to heavy discoloration with efflorescence and rust staining, full length x 2FT wide (70SF CS3, 200SF CS4). **North deck edge, outside G1 exhibited moderate discoloration with small areas of rust staining along the edge, and lighter discoloration along the girder (135SF CS2, 135SF CS3).**						
			Wearing Surface (Bare)	SF	4,005	**2,188**	**1,750**	**67**	0
			Debonding/Spall/Patched Area/Pothole	SF		0	**0**	**7**	0
			3'x2' spall in SW corner. Unsound Patch from 2022 **(6SF CS3)**. 1'x1' spall in SE corner. Unsound Patch from 2022 **(1SF CS3)**.						
			Crack (Wearing Surface)	SF		0	**150**	**60**	0
		3220	7 transverse cracks **typically up to 0.016IN wide with one crack over Pier 1 and 2 up to 0.05IN wide (150SF CS2, 60SF** CS3).						
			Abrasion, Wear, or Rutting (Wear. Surf.)	SF		0	1,600	0	0
		8911	Light abrasion in approximately 50% of driving lanes **(1600SF CS2)**.						

Example: Deck Condition

12 Reinforced Concrete Deck Element

Defects: Delamination/Debonding/Spalls/Patches/Cracking

Condition State	Severity	Extent	Condition Summary
CS4 = 55/4005 = 1.4%	Major	Isolated	*Top:* None reported *Bottom:* De-bonded and exposed rebar with measurable section loss – **strength is affected**
CS3 = 85/4005 = 2.1% D1080 = 60 D3220 = 32-7 = 25	Moderate	Isolated	*Top:* 7 SF unsound patch *Bottom:* Unsound patch overlapping with top (7 SF). Spalling with exp rebar…
CS2 = 650/4005 = 16.2% D1080 = 50 D1130 = 660-60(CS3) = 600 D3220 = 150 overlapping	Minor	Widespread	*Top:* Areas of cracking *Bottom:* Areas of delamination. Areas of top of deck cracking (overlapping CS2=150 SF & CS3=60 SF included with CS3).

Example: Deck Condition

12 Reinforced Concrete Deck & 8000 Wearing Surface (Bare Deck)

Defects: Delamination/Debonding/Spalls/Patches/Cracking/Abrasion

Condition State	Severity	Extent
CS4 = 1.4%	Major	Isolated
CS3 = 2.1%	Moderate	Isolated
CS2 = 16.2%	Minor	Some

Isolated major defect and strength is affected:

NBI Deck = 4

SNBI Table 20 Expanded④			SEVERITY①				
	Code②	Condition	INHERENT (CS1)	MINOR (CS2)	MODERATE (CS3)	MAJOR (CS4)	STRENGTH & PERFORMANCE AFFECTED ③
GOOD	9	Excellent	Isolated				
	8	Very Good	Some	*Isolated*			
	7	Good		Some			
FAIR	6	Satisfactory		Widespread	OR Isolated		
	5	Fair			Some *or* *Widespread*	*Isolated*	*AND* NO
POOR	4	Poor			Widespread	OR Isolated	AND YES *12 MO INTERVAL*
	3	Serious					SERIOUSLY *AFFECTED* *≤12 MO INTERVAL*
	2	Critical					COMPONENT *COMPROMISED* *≤6 MO INTERVAL*
	1 & 0	*BRIDGE IS CLOSED. 1 = repaairs may return to service, 0 = replacement is required.*					

① *Refer to SNBI item commentary and Appendic C for rules and clarification.*
② *The whole description must read true for the code to apply.*
③ *Strength and performance determined by Structural Review findings.*
④ *SNBI Table 20 governs for any conflict with this SNBI Table 20 Expanded*

R B.C.10 Channel Protection Condition Rating

- Installed vegetation are considered Biotechnical Countermeasures. Vegetative banks can be evaluated for B.C.10.
- For bridges where no slope protection has ever been installed under the bridge,
  - Code B.C.10 = N (NOT APPLICIBLE)
  - Assessment 9041 Slope Protection - Bare included in the inspection.
- Missing riprap or covered with silt - code the appropriate effectiveness of the Assessment 9045 Slop Protection Riprap.

SNBI B.C.10 - Channel Protection Condition Ratings

The following criteria should be used to rate item B.C.10 (Channel Protection).

Code	Condition	Description
N	Not Applicable	Bridge does not cross over water.
9	Excellent	Isolated inherent defects.
8	Very Good	Some inherent defects.
7	Good	Some minor defects.
6	Satisfactory	Widespread minor or isolated moderate defects.
5	Fair	Some moderate defects. Performance of the channel protection is not affected.
4	Poor	Widespread moderate or isolated major defects; performance of channel protection is affected.
3	Serious	Major defects; performance of channel protection is seriously affected. Condition typically necessitates more frequent monitoring or corrective actions.
2	Critical	Major defects; channel protection is severely compromised. Condition typically necessitates more frequent monitoring or corrective actions.
1	Imminent Failure	Channel protection has failed, but corrective action could restore it to working condition.
0	Failed	Channel protection is beyond repair and must be replaced.

SNBI Commentary

- Channel protection devices are considered countermeasures that control, inhibit, delay, or minimize stream instability and scour problems, including river training and armoring countermeasures. River training countermeasures may include: spurs, bendway weirs, guide banks, drop structures, and check dams. Armoring countermeasures may include: rock riprap, grouted riprap, concrete slope paving, articulating concrete blocks, gabion mattresses, and grout-filled mats.
- Evaluate the condition and effectiveness of channel protection devices installed on banks or in the stream to mitigate channel issues that may impact the bridge. When reporting this item, consider erosion and scour, damage (unraveling, displacement, separation, and sagging), and material defects (scaling, abrasion, spalling, corrosion, cracking, splitting, and decay).

R

B.C.11 Scour Condition Rating

- The entire code description must be satisfied for the code to apply. 4 = “Widespread moderate or isolated major scour; strength and/or stability of the bridge is affected.” The scour appears to be widespread moderate or isolated major but is strength or stability affected.
- If strength or stability is affected, there should be a structural review. If the defects push this to a Scour Condition Code 4, this would warrant a structural and/or hydraulic review to determine the effect on strength/stability.

Knowledge Check

What measurement should be checked/verified at each inspection to see if material exists above deck/slab/culvert barrel? True or False, Can bridge safety be impacted by this?

Overburden-Can be consider fill above a culvert/bridge structure or an overlay.

True – Extra weight beyond the designed dead load of the deck can lower the load rating

N

Bats, Birds, and Structures

- Protected Bats
- Migratory Birds
- Structure Inspections
- New Guidance Document

NLEB photo by Dave Redell, WDNR

Protected Bats

- WI cave-dwelling bats
  - Northern long-eared bat*
  - Tricolored bat*
  - Big brown bat
  - Little brown bat
- Protections
  - WI Endangered Species Law
  - Endangered Species Act*

Big brown bat, MNDOT

Bat Usage of Transportation Structures

- Bridges
  - Concrete
  - Steel
  - Timber
- Culverts
- Tunnels

- Expansion/hinge joints
- Abutments gaps
- Concrete cracks
- Drains
- Deterioration/rough surfaces
- Inside corners

Indicators of Bat Presence – Roosting Bats

- Expansion joints
- Vertical surfaces

Photos courtesy of MNDOT

Migratory Birds

- Migratory Bird Treaty Act
  - Protects native bird species
  - Unlawful to “take” any migratory bird, active nest, or egg
- Bridges/culverts can be nesting habitat
- Construction/maintenance activities

Migratory Birds

Cliff Swallow

Eastern Phoebe

Barn Swallow

American Robin

Bird Nests

Photos courtesy of MNDOT

N

Structure Inspection Field Manual Update

Guidance to be provided in the Field Manual

Animal Nesting/Roosting Presence on the Structure: Check the box if the possible migratory bird nesting or bat roosting presence is on the bridge. Provide comments on observations (i.e. swallow nests or droppings on girders. Bat droppings below joints. Observed swallows in flight under bridge). The presence of nesting materials of unknown origin should also be noted.

Inspection report to have the following added in area of other comment boxes:

❑ Animal Nesting/Roosting Presence on the Structure

Box for additional comments.

New Guidance Document

Guidance for Structure Inspectors on Incidental Bat and Migratory Bird Usage of Transportation Structures

Noting incidental observations of bat and bird use of structures can help designers and environmental coordinators prioritize regulatory bat/bird inspections and anticipate timing restrictions for improvement projects.

This document is intended as a reference for structure inspectors to better understand signs of bat and bird use on structures. This document is not a comprehensive guide for completing inspections for bat or migratory bird presence for regulatory purposes.

Incidental observations of bat and bird use should be documented in the bridge inspection report.

Indicators of Bat Presence

The most used structure types for bat roosts include:

- Timber structures (although these structure types occur less often)
- Concrete arch structures
- Concrete girder structures
- Concrete box structures
- Steel structures

Additionally, structures that cross rivers have a higher utilization for bat roosts.

Indicators of bat presence are most identifiable during the bat's active season, from April to October. When looking for indicators of bats, inspect:

- Expansion joints
- Areas below joints
- Abutments
- Inside corners
- Beams
- Pier caps
- Other cracks and crevices

Indicators of bat presence are explained below and include example photos when applicable.

Roosting bats: Bats may be roosting in small cracks or cave-like areas of a bridge, such as between the bridge deck and end wall, or out in the open along the underdeck of a bridge. Shining a flashlight into cervices is a useful way to detect roosting bats.

Guidance for Structure Inspectors on Incidental Bat and Migratory Bird Usage of Transportation Structures

Presence of Guano: Guano, or bat droppings, may be found where bats commonly roost. It appears like brown/black pellets that accumulate on the ground as well as adhere to support beams and walls underneath bat roosts.

Staining: Light to dark brown stains from urine or body oils may appear wet and are usually found in dark places. The staining can dry to a whitish crust. Look for 4-6-inch-wide dark stains underneath where bats may be roosting. Guano stains almost always accompanies bat urine or body staining.

Staining from bats can be distinguished from water seeps, salt, asphalt leaching, or other structural deterioration mechanisms by the presence of guano. Guano may be stuck to the surface where the staining is or onto surfaces nearby. Look closely at suspected staining to search for intermixed guano.

Audible observations: Bats make high pitched squeaking or chirping when approached.

Odor observations: If there are enough bats present, guano deposits, especially in large amounts, have an ammonia odor that can be apparent in some situations.

Guidance for Structure Inspectors on Incidental Bat and Migratory Bird Usage of Transportation Structures

Indicators of Migratory Bird Presence

The birds listed below may be found nesting underneath bridges or within culverts. Below are pictures of birds and their nests. Presence of nests or spotting birds is the primary indicator of bird usage of a bridge or culvert.

The nesting season in Wisconsin is depicted in the graphic to the right.

Cliff Swallow

Commonly nest underneath bridges or within culverts.

Colonially nests in gourd-shaped mud nests, often below bridges or inside culverts.

American Robin

Occasionally found nesting underneath bridges.

Bowl-shaped nest out of twigs and grasses in trees, gutters, eaves, and the underside of bridges.

Barn Swallow

Commonly nest underneath bridges or within culverts.

Nests alone or in small groups in bowl-shaped mud nests, often found underneath bridges or on culvert walls.

Eastern Phoebe

Occasionally found nesting underneath bridges.

Constructs large nests out of mud, moss, and leaves under eaves or ledges.

In addition to the species listed above, there may be other, non-migratory and non-protected birds, like pigeons, present and/or nesting on the structures. Their presence can also be documented in the bridge inspection report.

More information about bats and migratory birds:

Contact

Jen Gibson

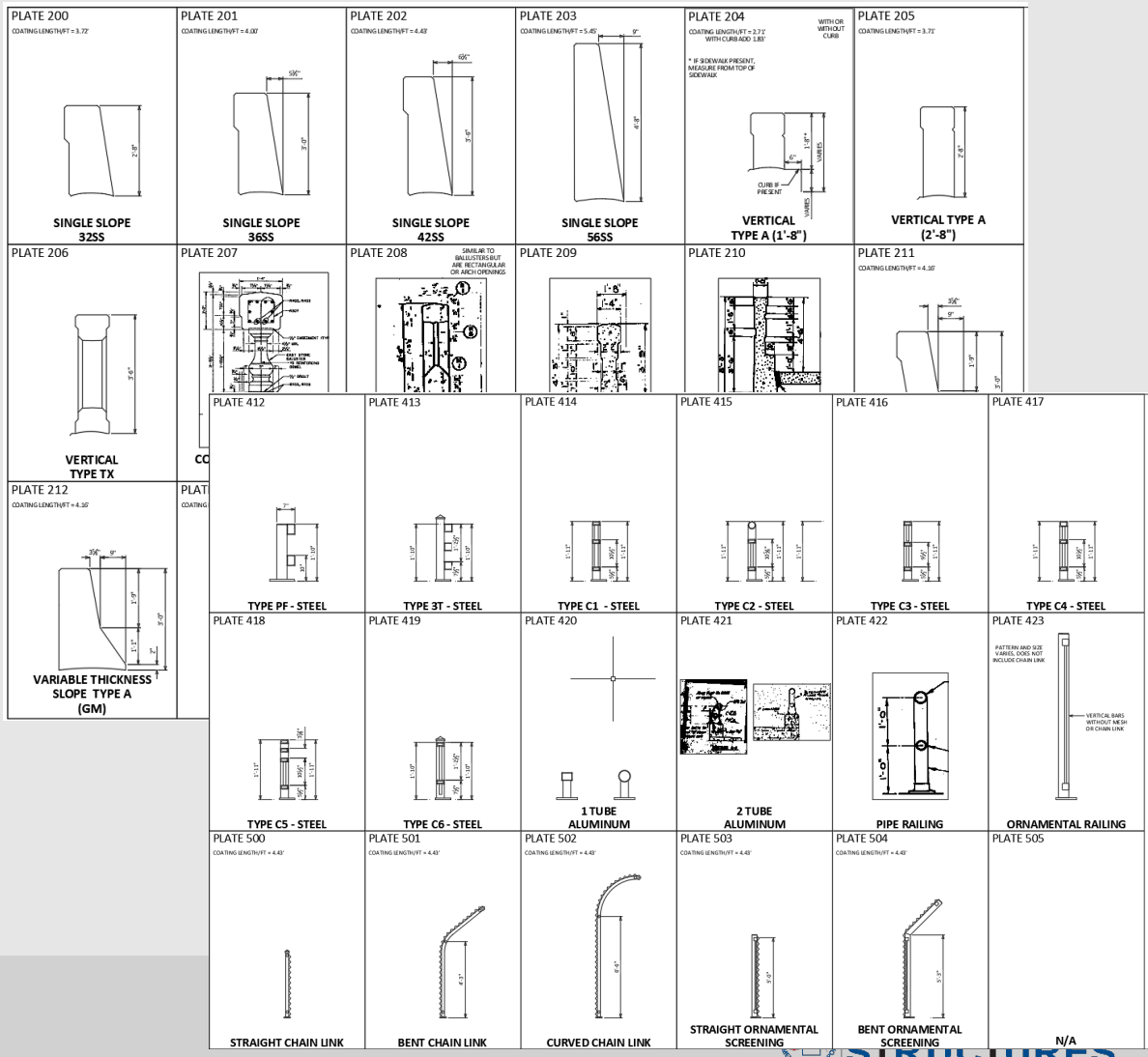
Statewide Ecologist & Wetland Biologist

Jennifer.Gibson@dot.wi.gov

920-492-4160

SNBI Railings

- Inspectors need to verify **EVERY** rail type and transitions, HSIS has many errors and inconsistencies
- Many different configurations
- Example drawings available
- Name of rail in HSIS has changed to match plan sheet detail names as much as possible

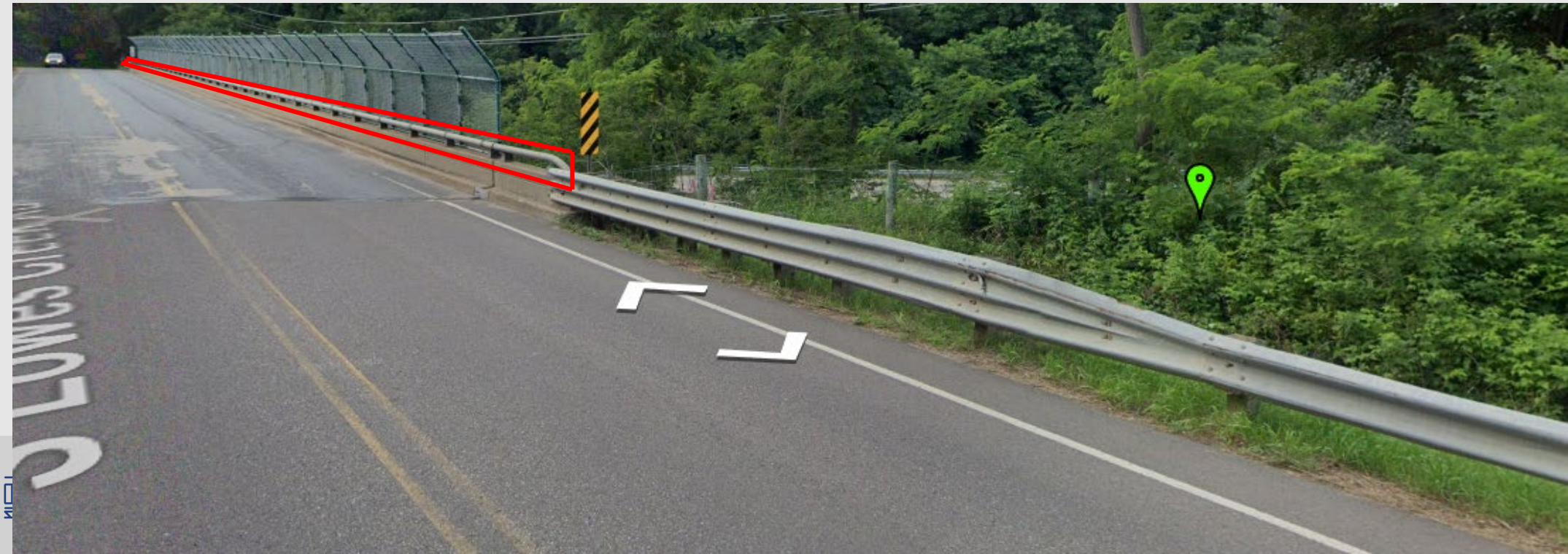


Primary Rail

- Attached to Deck
  - Controls Crash Rating
  - Concrete, Steel, Aluminum, Timber
  - 54 Types

Decorative Rail

- Typically Attached to Top of Primary Rail
  - May be attached to Deck – Does not control rating
  - Steel, Aluminum
  - 24 Types

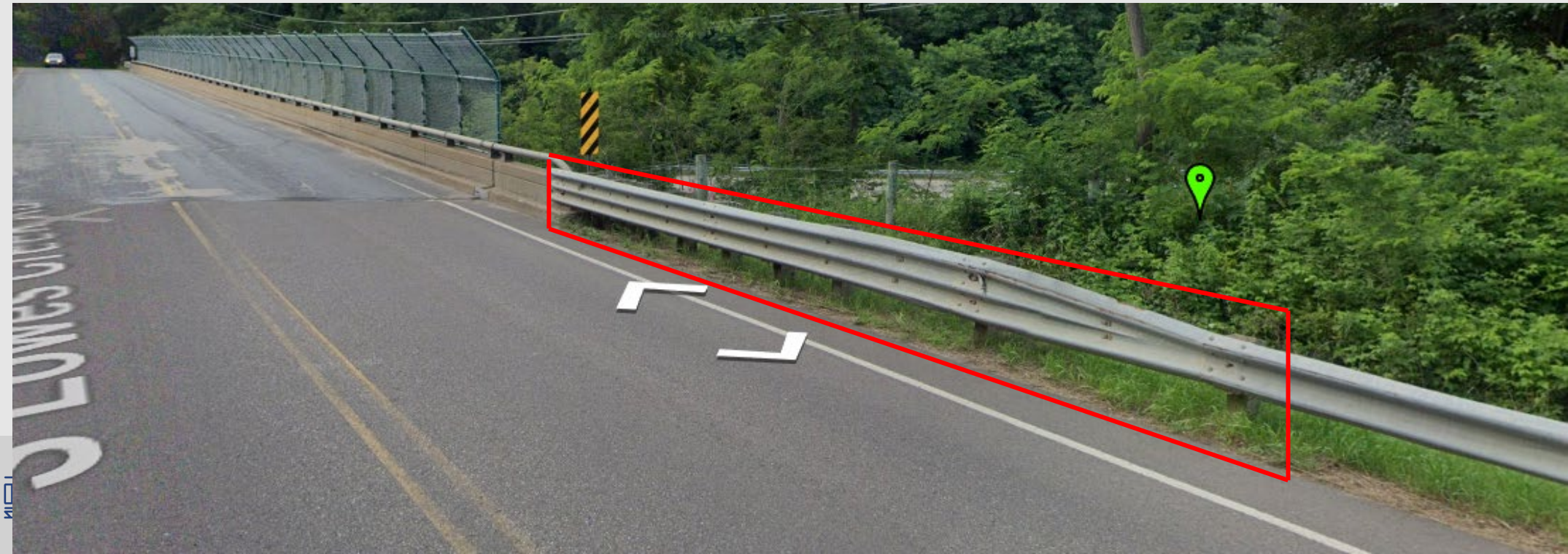


Screening

- Typically Attached to Primary Rail,
  - Steel, Aluminum
  - must have chain link or mesh
  - 5 Types

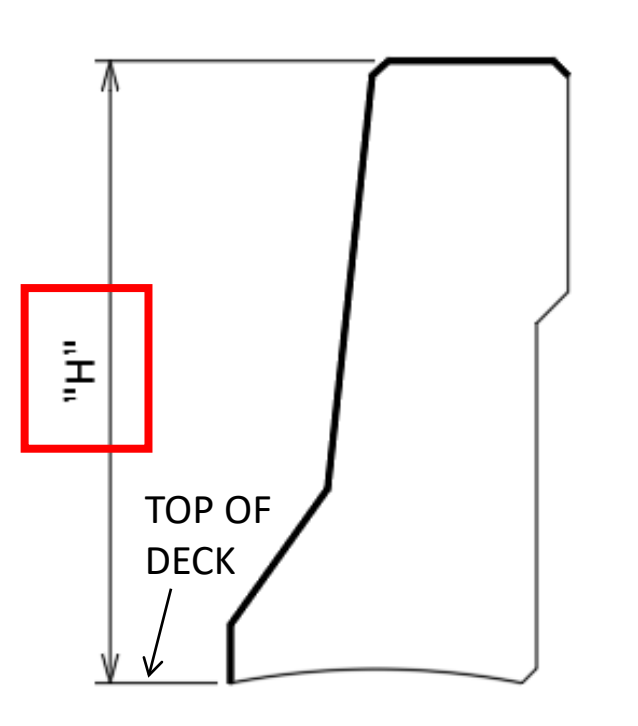
Transition

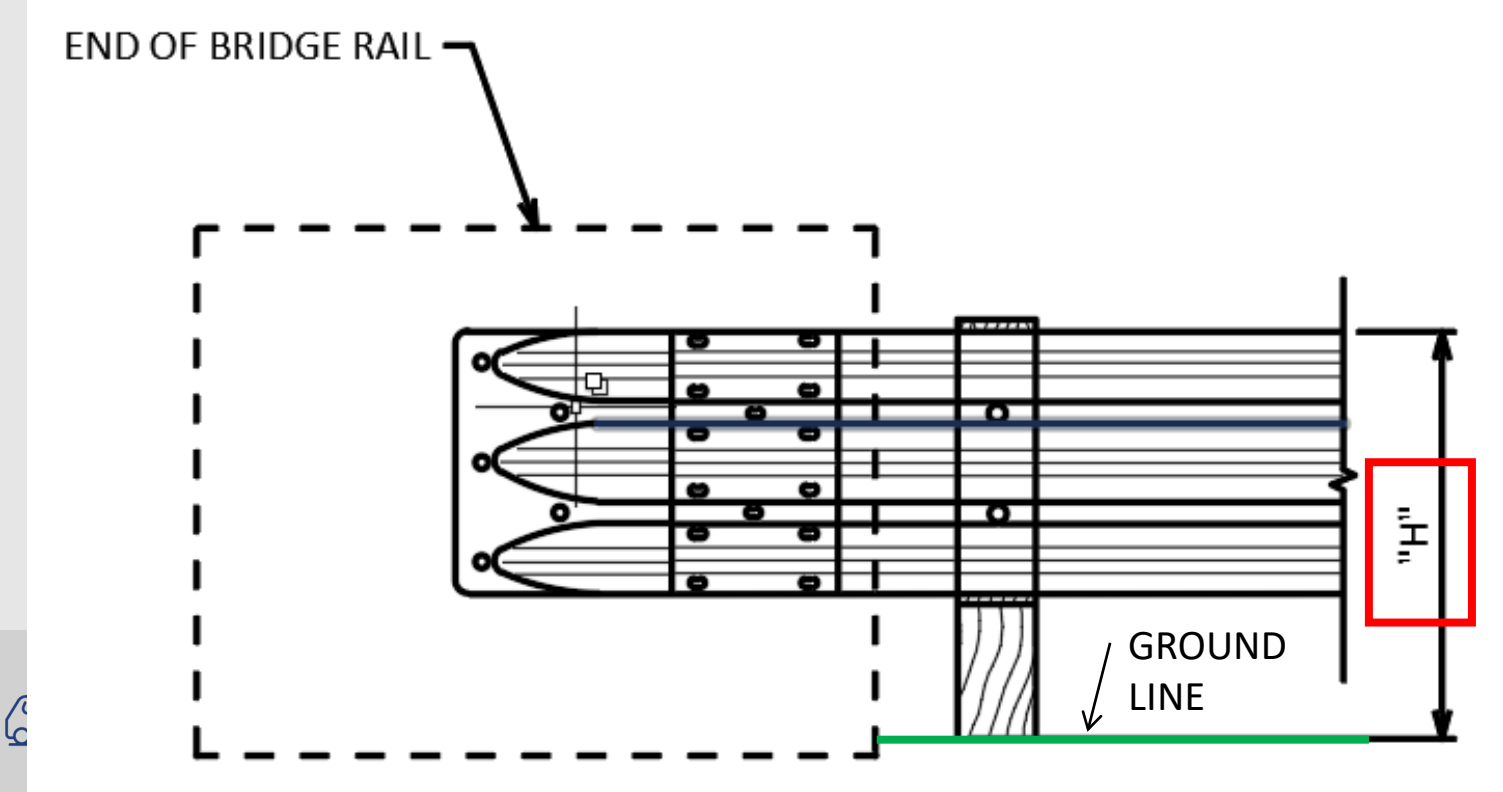
- Attached to End(s) of Primary Rail
  - Concrete, Steel
  - 24 Types



Where to Measure?

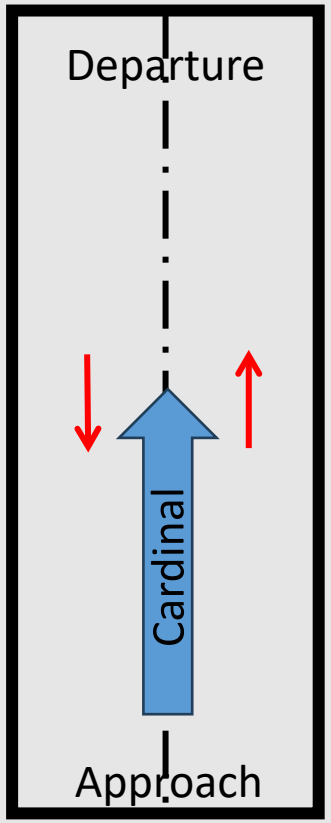
- Top of Pavement or Shoulder to Top of Rail
  - Height - to nearest inch
  - Transitions - within 1-2 posts of end of bridge rail



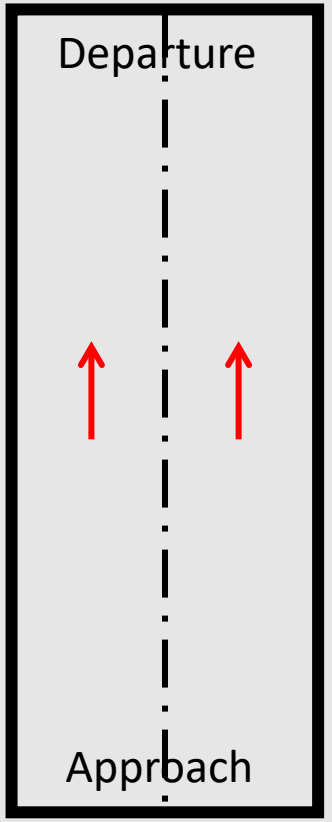


Where to Measure?

- Two Way
  - Cardinal = Approach
  - Non-Cardinal = Departure
- One Way
  - Approach
  - Departure



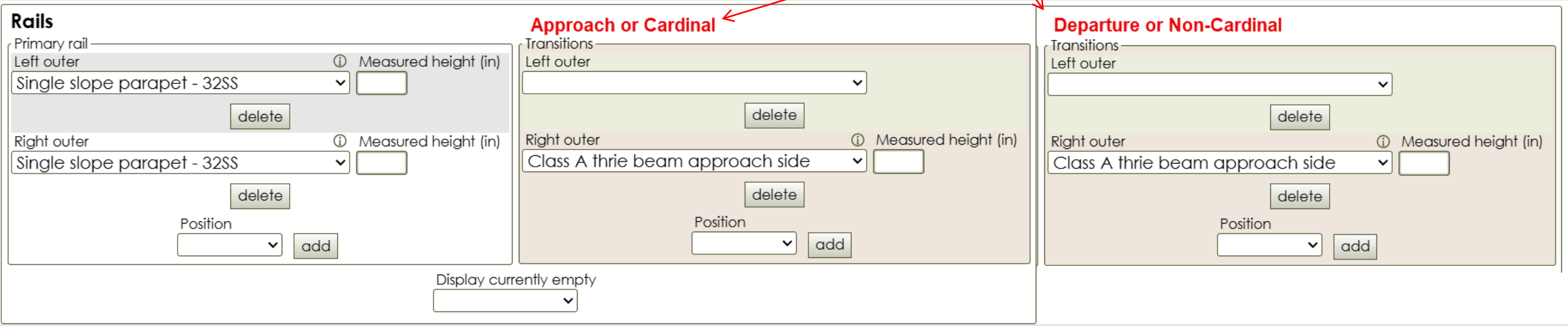
Two Way Traffic

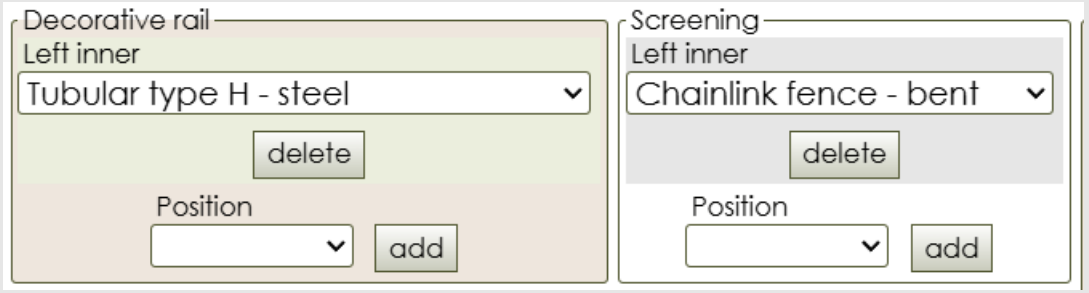


One Way Traffic

HSIS

Needs to be added (April?)

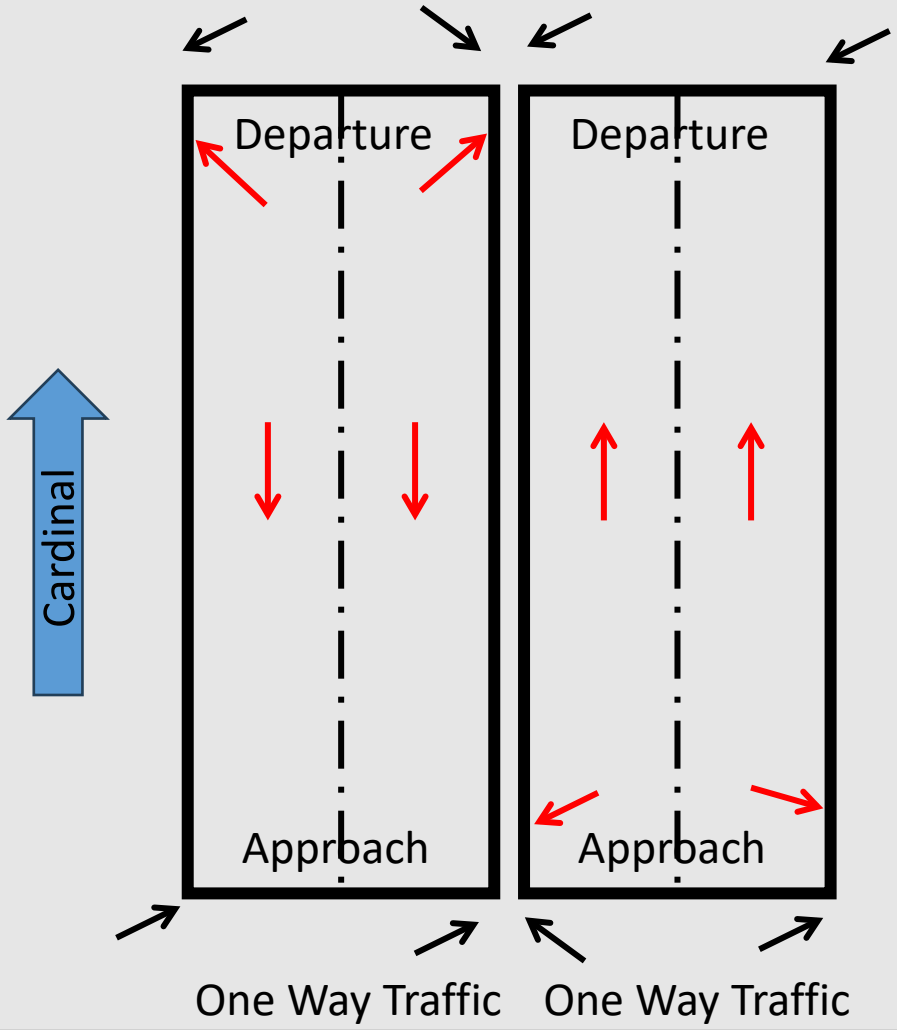




N

Where to Measure?

- Divided One Way (Same Bridge)
  - Cardinal = Approach
  - Non-Cardinal = Departure

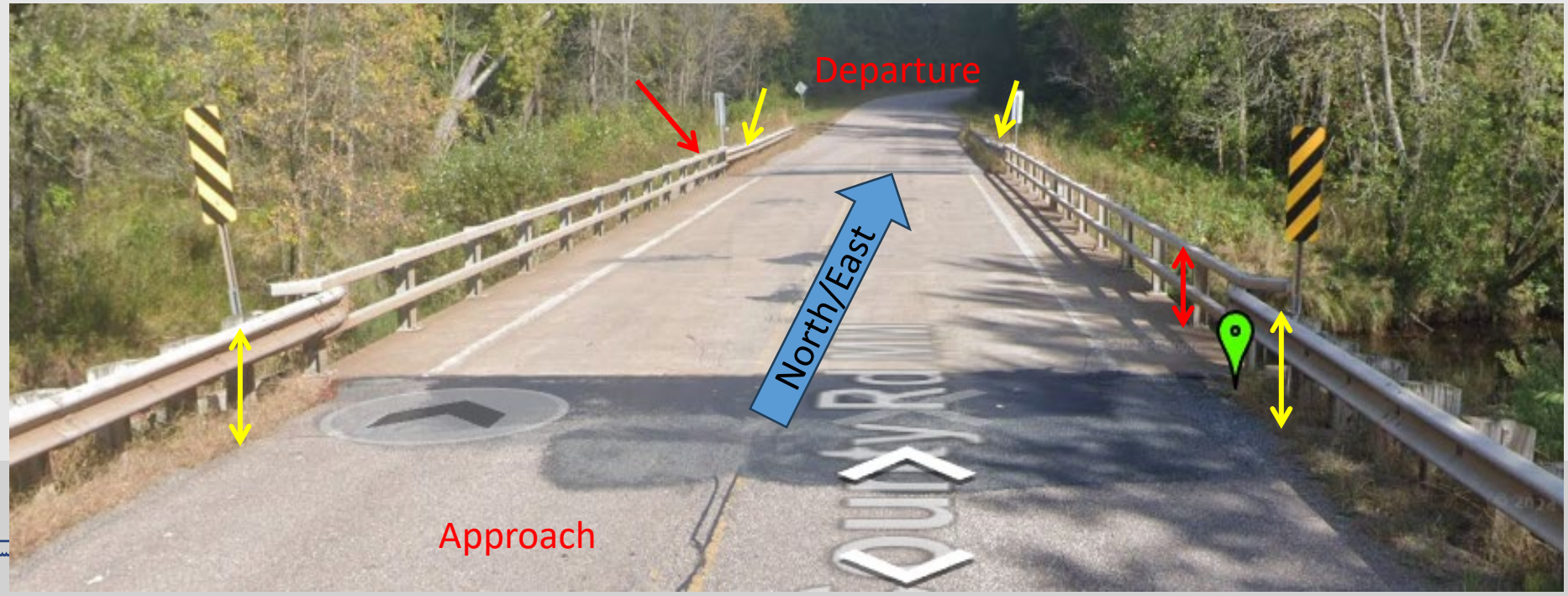


N

Where to Measure?

- Red Arrows – Primary Rail
  - Approach Sides or
  - Obvious Minimum Height
- Yellow Arrows – Transition
  - All Corners

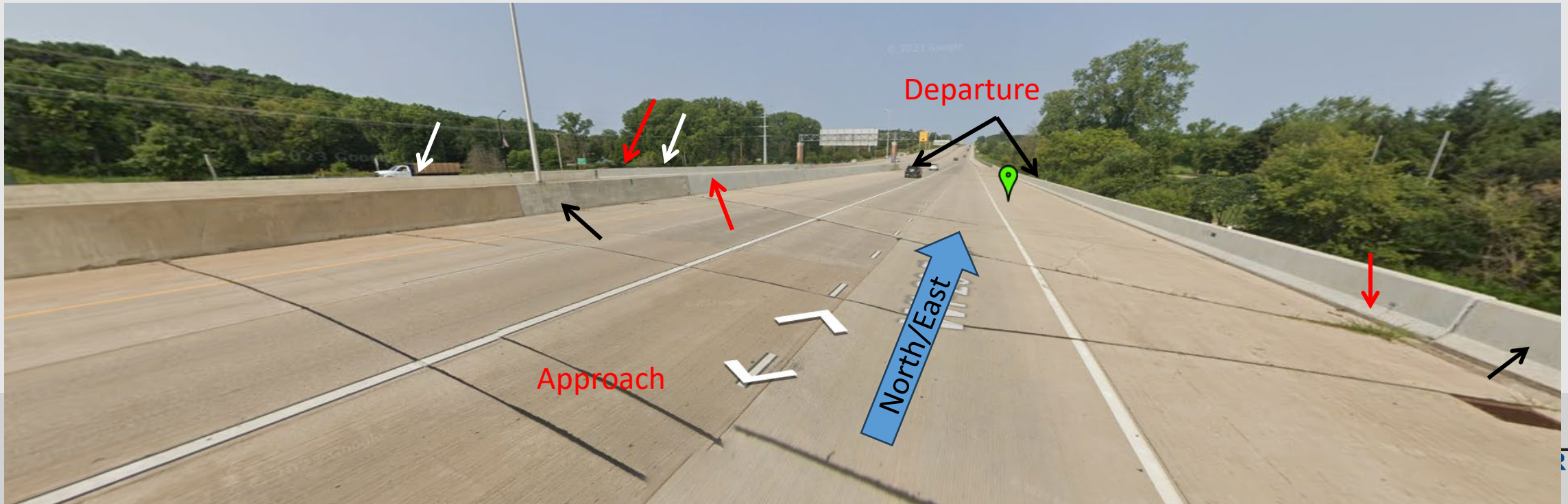
Two Way Traffic



Where to Measure?

- Red Arrows – Primary Rail
  - Traffic Approach Side
- Black Arrows – Transition
  - All Corners

Divided One Way Traffic on Same Bridge



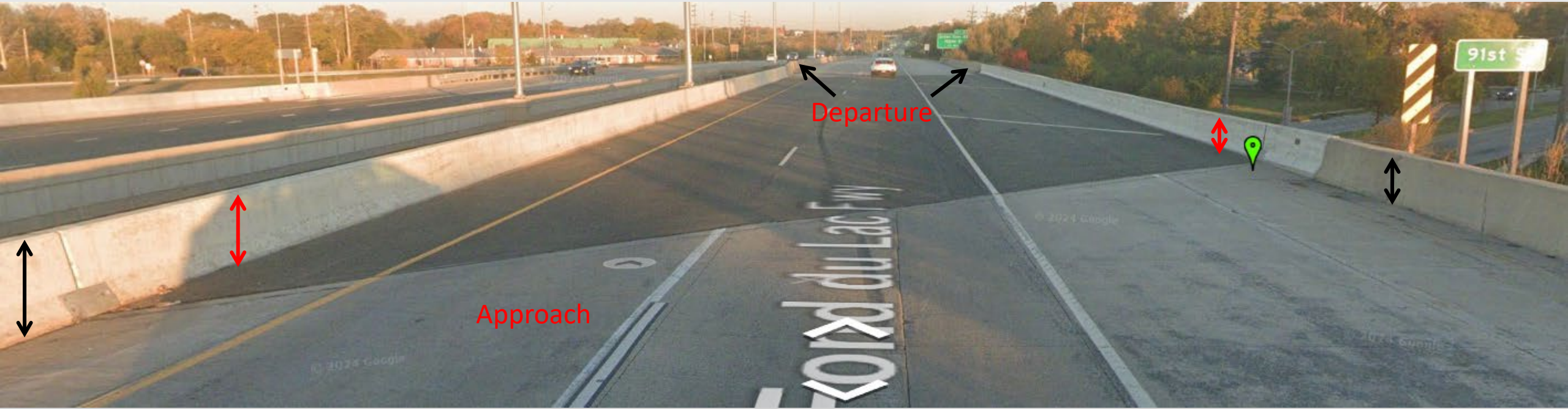
N

Where to Measure?

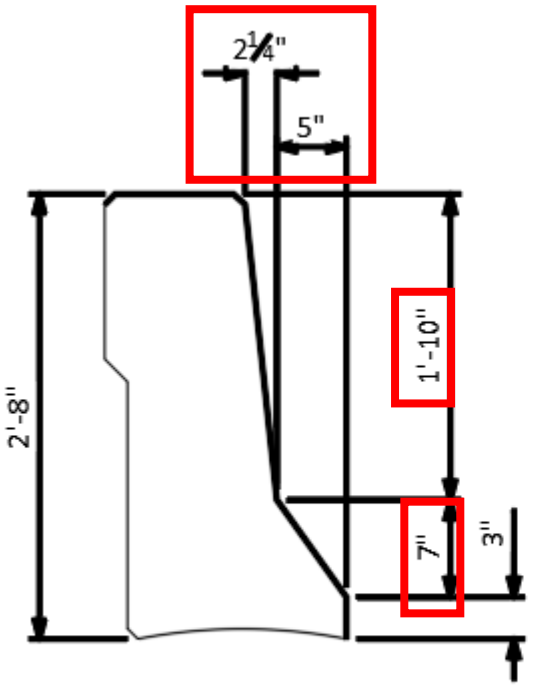
- Red Arrows – Primary Rail
  - Traffic Approach Side
- Black Arrows – Transition
  - All Corners

Cardinality does not affect transition for one way traffic unless both directions are on same bridge

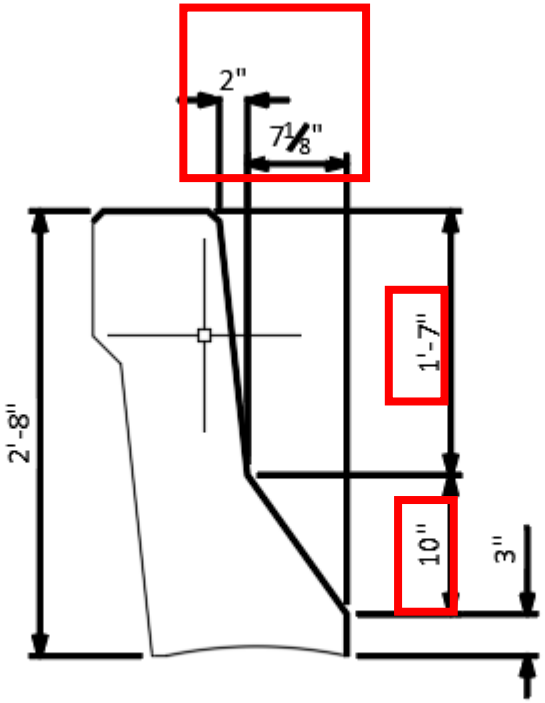
One Way Traffic



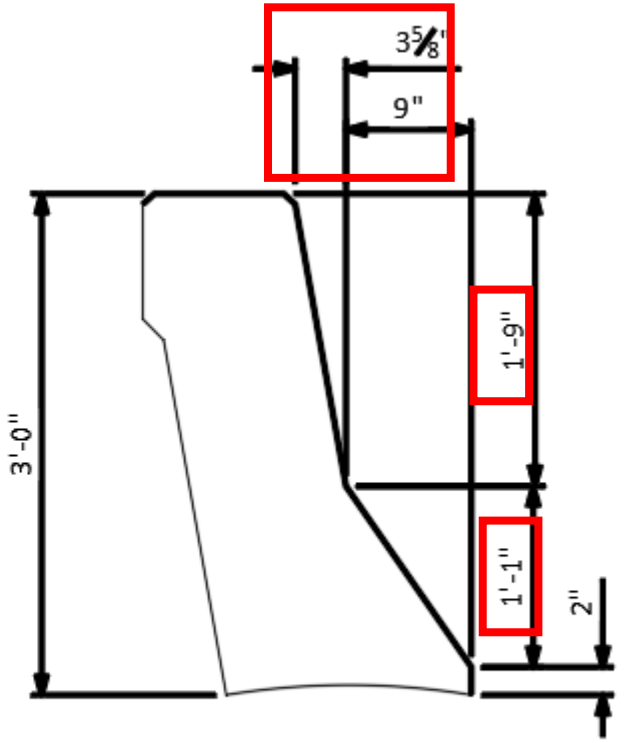
How to Tell “F” from “NJ” from “GM”?



SLOPED TYPE LF
(F)

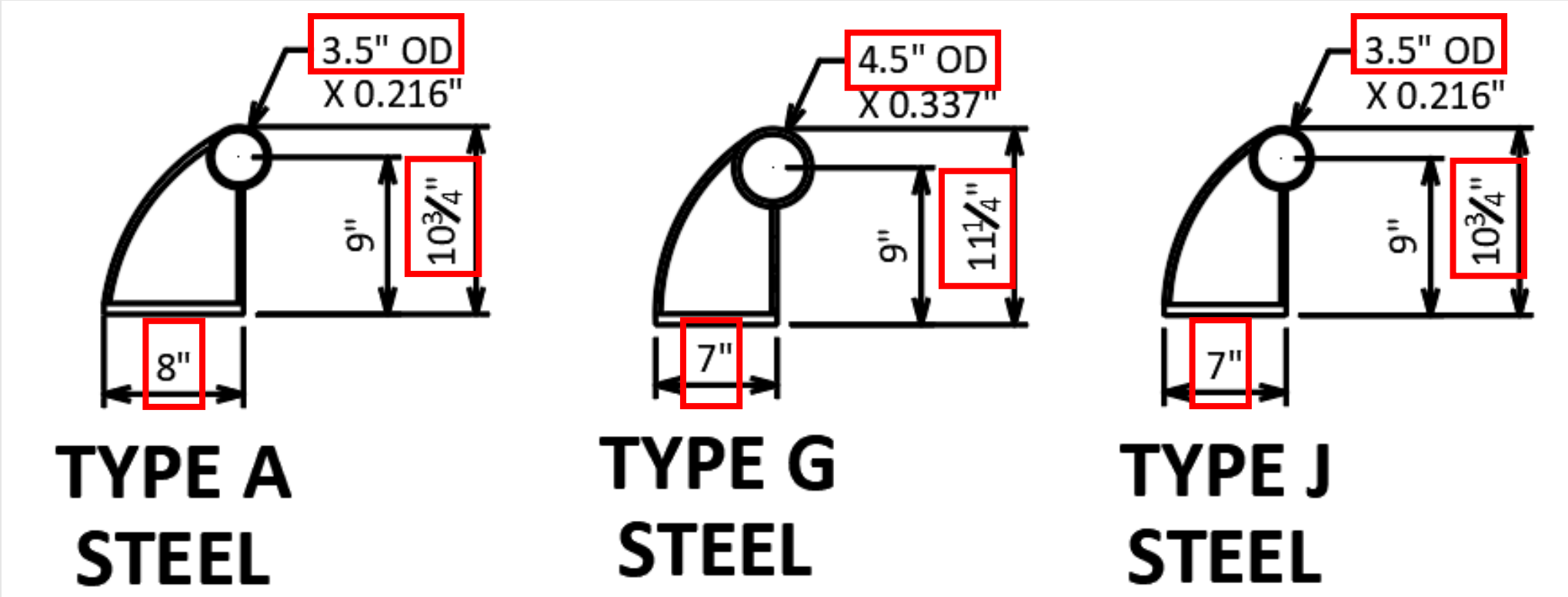


SLOPED TYPE B
(NJ)



SLOPE TYPE A
(GM)

How to Tell “A” from “G” from “J”?

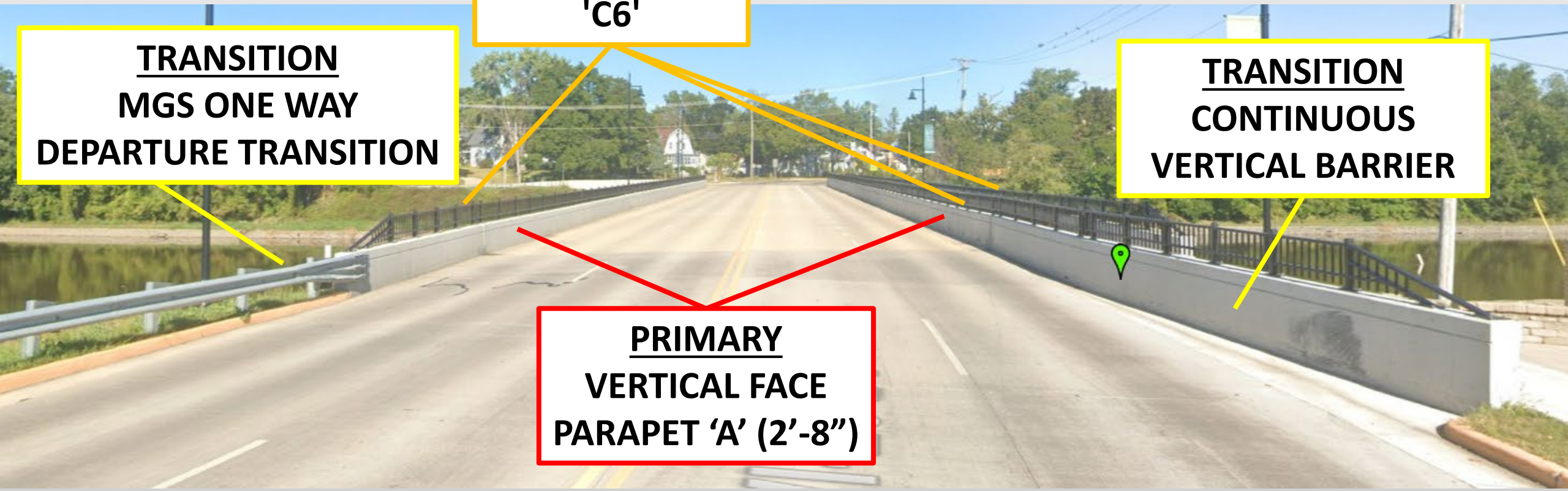


How to Tell MGS from Class A?

Example 1 – Identify Rail Types

Example 1 – Identify Measurement Location

Example 2 – Identify Rail Types



Note: Can't see them, but there are transitions on the other end of the bridge

N

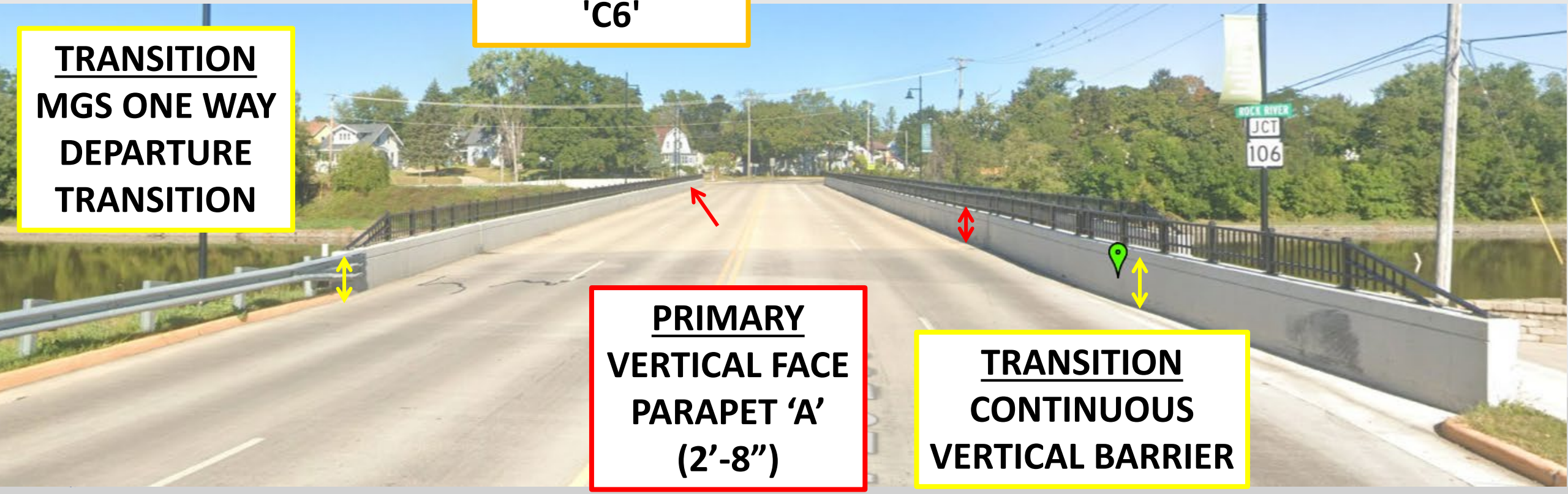
Example 2 – Measurement Location

DECORATIVE
COMBINATION RAILING TYPE 'C6'

DECORATIVE RAIL - NO MEASUREMENT

Note: Can't see them, but there are transitions on the other end of the bridge

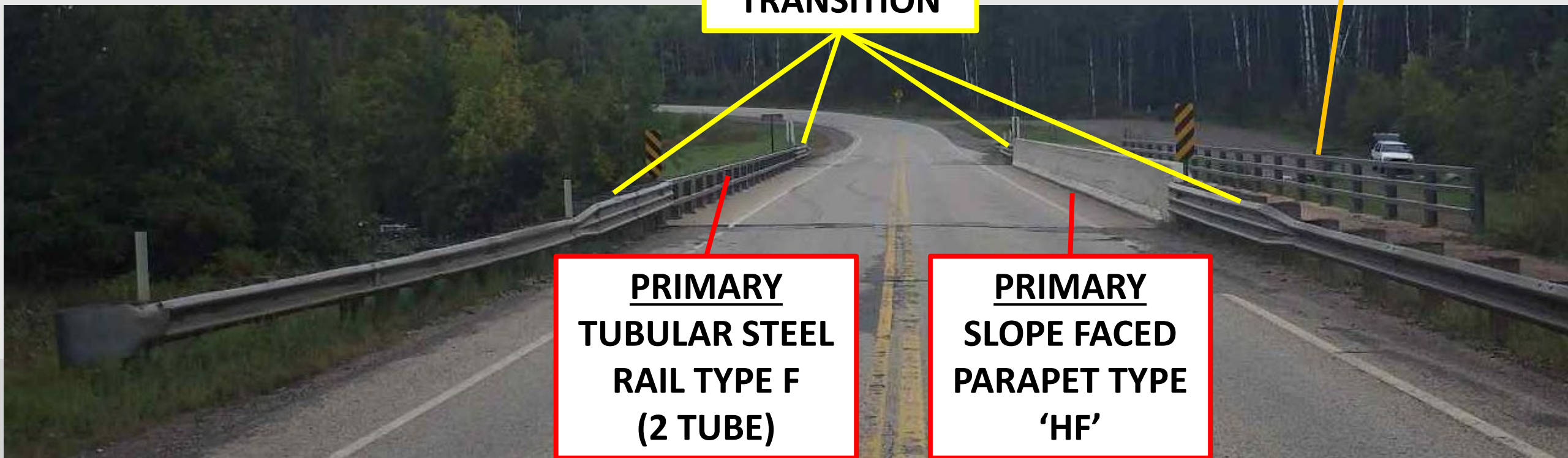
TRANSITION
MGS ONE WAY DEPARTURE TRANSITION



PRIMARY
VERTICAL FACE PARAPET 'A' (2'-8")

TRANSITION
CONTINUOUS VERTICAL BARRIER

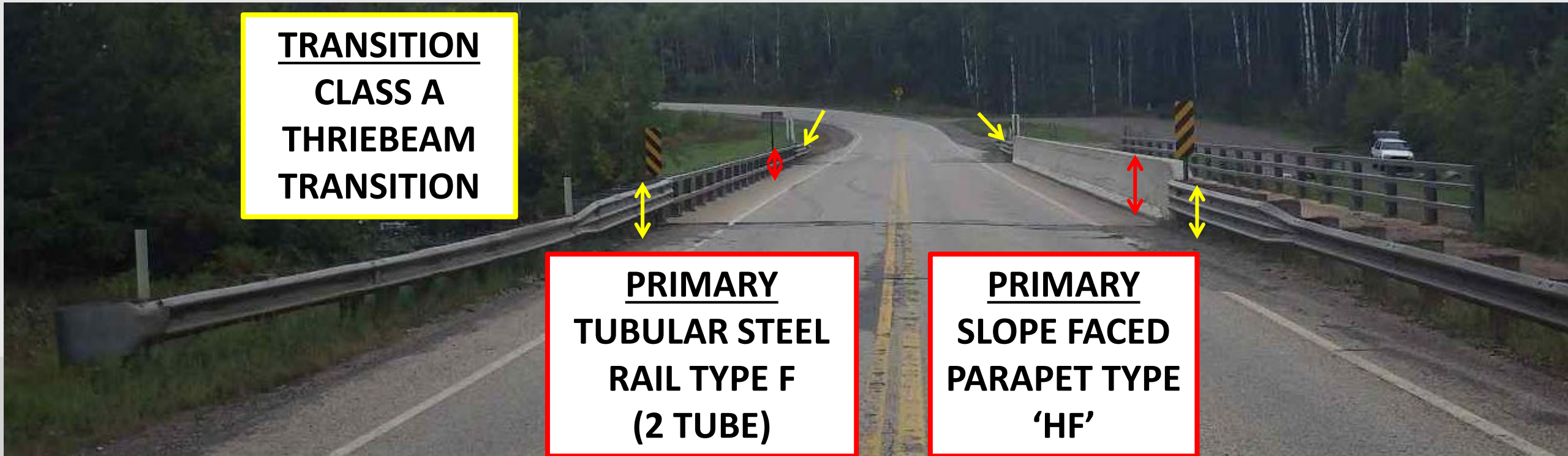
Example 3 – Identify Rail Types



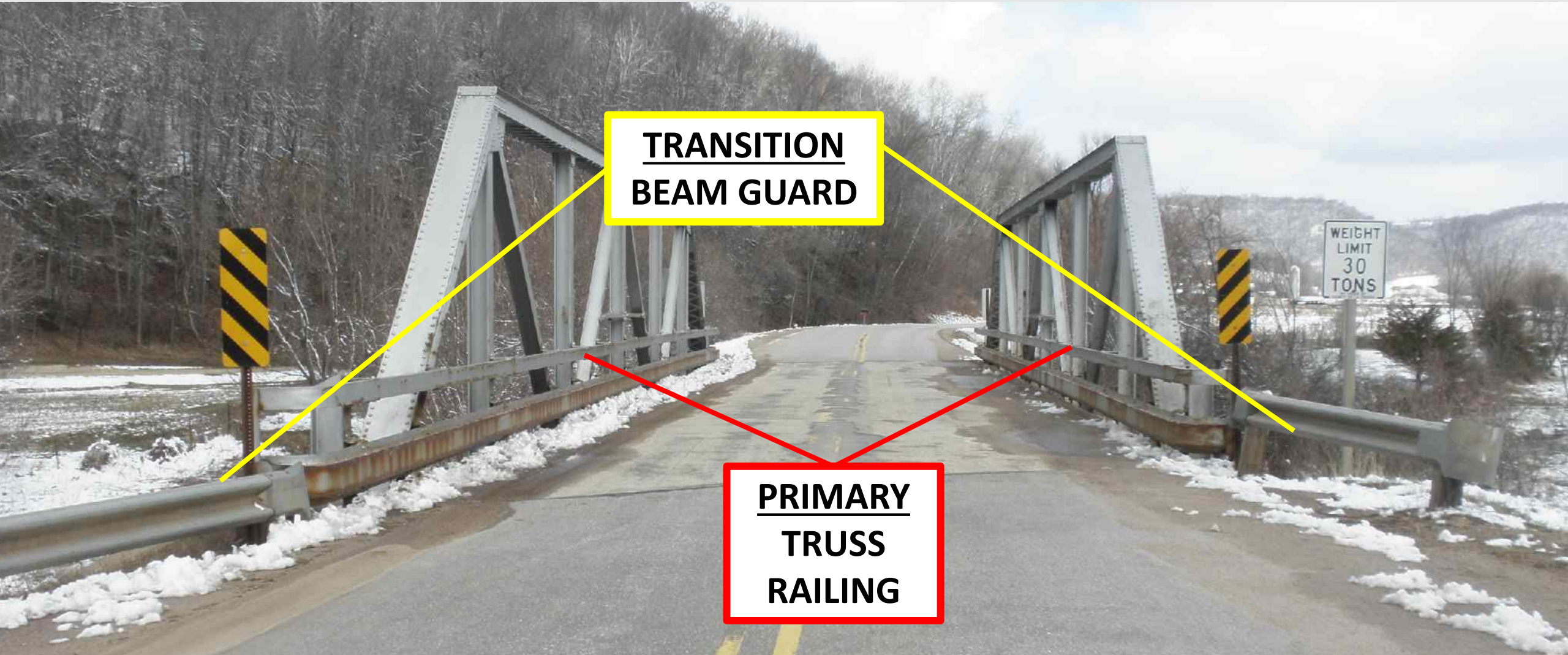
Example 3 – Identify Measurement Location

DECORATIVE RAIL - NO MEASUREMENT

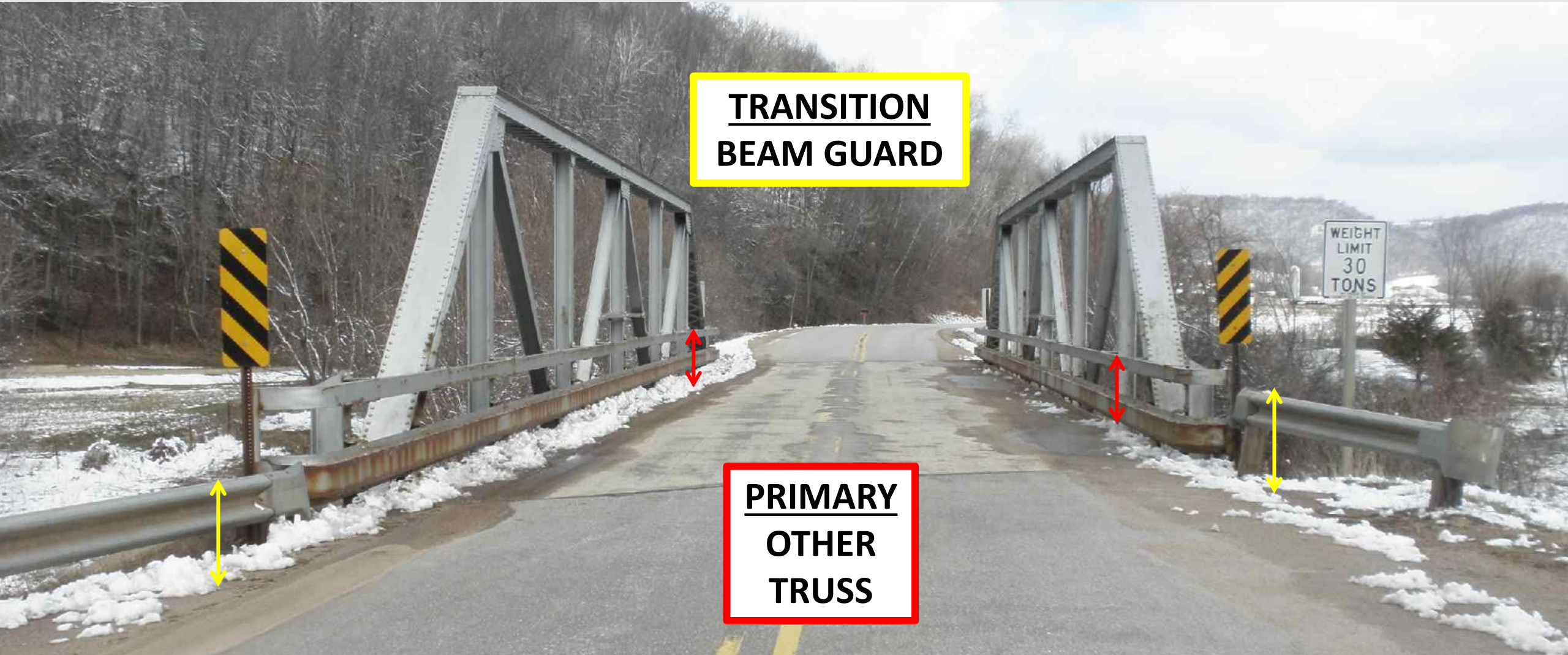
DECORATIVE
TUBULAR STEEL RAIL TYPE F (3 TUBE)



Example 4 – Identify Rail Types



Example 4 – Identify Measurement Location



WisDOT Bridge Inspection Refresher Training 2025

2024 QA Review Findings

R Summary of Bridge Inspection #'s Reviewed

- Lift Bridges
  - 2 local
- North Unit
  - 13 Counties for local level
  - NC Region for State level
- South Unit
  - 5 Counties for local level
  - No State level
  - FHWA QA of SW La Crosse & Madison

Number of Bridges:

- Lift Bridges
  - 2 local
- Local Bridges
  - 69 County/Municipality
- State Bridges – 3 in NC
- FHWA Review (State & Local)
  - Madison – 7 bridges
  - La Crosse – 12 bridges

R

Types of Inspections Reviewed

- Routine
- Scour POA – at least 1 per program
- UW Profiles & UW Dives
- NSTM – when available in the program
- Lift Bridges

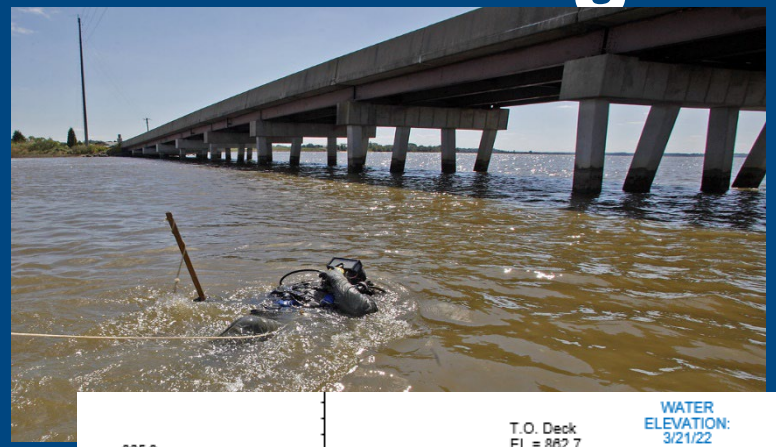
Additionally: Bridge File Documentation Form

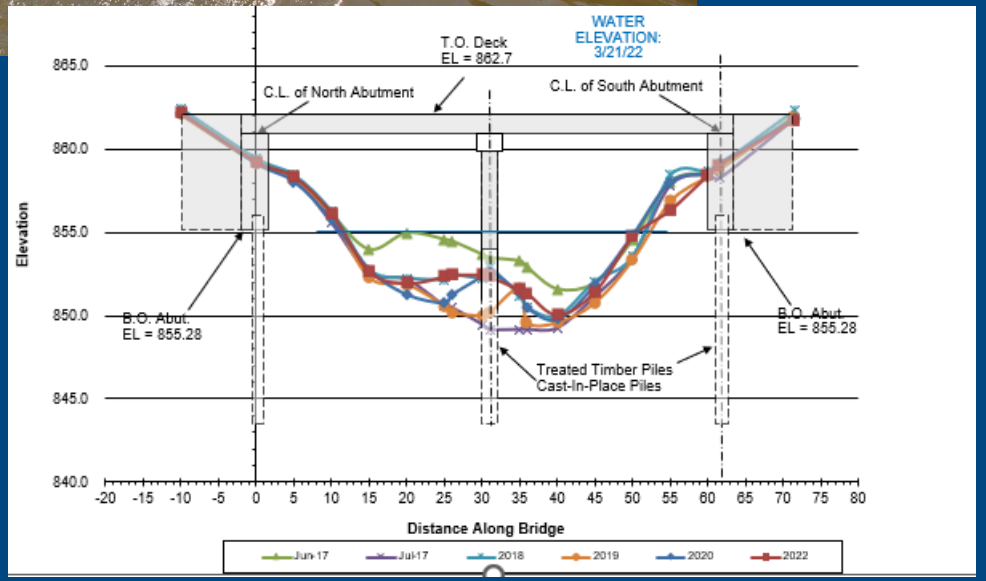
Scour POA Findings

- Triggers were general in ~50% of bridges reviewed
  - Not specific to bridge
- Triggers should be specific elevation or reference point on bridge
  - Reference mark on abutment or wing
  - Bottom of girder
  - Easily referenced
- Not all POA's were updated in HSIS when due
  - Typically should be reviewed every 48 months

R UW Profiles and UW Dive Findings

- UW Profiles Due Every 96 months
  - Every 24 months if Scour Critical
- Things to include in UW Profiles
  - Historical profiles
  - Abutments & piers in relation to stream bed
  - Foundation information (when known)
  - Water level at time of inspection
  - More than 3 points
- Data/Files need to be accessible in the future
- 2 Structures Needed Dives
  - Followed up on and completed in 2024





NSTM Findings

- Not all counties had an NSTM
- NSTM Inspections should include
  - Detailed procedure for inspection
  - NSTM diagram
  - Detailed condition of each NSTM member (may need supplemental document)
  - Proper cleaning prior to inspection
- Floor Beams >14’ apart
  - Treated as NSTM (SIM 1.3.5.1)

NSTM Inspection Procedures

- Must be able to be within arms' reach of every NSTM member
  - May need different procedures for different parts of the bridge
  - Remove laminate rust and measure section loss
- What to do if load posted?
  - Consider climb inspection
  - Rent Anderson under-bridge inspection unit – lighter weight than snooper

R

Needed Reminders

- Assessment 9001 should be on every inspection report
- Verification of overburden thickness
- Deck element area is different from wearing surface area
- New terminology for crack width
- ADTs need to be current – within 5 years
- Discoloration defect
- Use correct priority for maintenance items – low, medium, high & add pictures
- Wearing surface type – element should match what is on structure information page
- UW Probe form – fill in values and information for boxes
- Bridge Scour – Add footing element if it is exposed

R

Needed Reminders - Continued

- Exposed piling – add element if piling is exposed from settled slope (Steel protective coating if painted)
- Add steel protective coating for metal bridge railings
- Delaminations vs Spalls
- Pictures should be included for defects
- All pictures should be date-stamped
- Pictures should be no more than 4 years old
- Include updated photo for cover page

R

Needed Reminders - Continued

- Joints should be measured – input data with temperature on Structure Information page
- Columns vs Piles
- Top flange vs Deck
- Bracing/Strut – 1 each per pier
- Wing lengths – should be on SIA form or enter under Abutment tab

- Each photo in an inspection report does not need to be linked to an element
  - Only link when needed for a defect
  - Don't need to link more than 1 for a defect

R

Lift Bridge QA Summary

New in 2024

- The inspections were overall good quality
  - Some forms not filled out correctly or outdated forms were used
- Maintenance activities which could be done on the bridges were discussed

Overall Summary of County Reviews

- Ranged from excellent to fair
- The majority were good to fair
- Four counties in the north and 1 in the south were excellent

R

2025 QA Reviews

- Counties to be reviewed
  - North Unit: 11
  - South Unit: 8
- Region/s to be reviewed - NW
- Reminder to get DT2002 submitted if you have not done so
- Supplemental form for sub-programs
  - New for 2025

R

Session 6.2 – Steel Section Loss

R

Learning Objectives

- Review Methods to Measure and Determine Section Loss
- Determine Expected Course of Action for Section Loss Depending on Various Factors
- Decision Making Process Due to Amount, Extent, and Location of Section Loss

R

Inspector Responsibilities

- Obtain and report accurate Condition States
  - CS3 = measurable section loss
  - CS4 = section loss that requires a review of the strength of the member
  - Overburden (Asphalt overlay)
- Inspection Team Leader's responsibility to recommend analysis
  - Notify bridge specific PM about need for load rating/re-rating
  - Engineering Judgement
  - Structural analysis

R

Concept

- Remaining steel section can be measured
- With plans, determine average % section loss from original section
  - If no plans available (P-structure), compare to un-deteriorated section
- Measure at the worst location
- Report **web/top flange/bottom flange**

R

Equipment

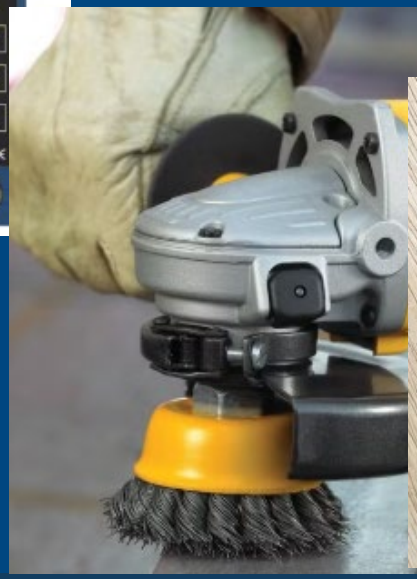
- Wire brush/wheel/grinder - $360
- Hand broom - $12
- Leather gloves - $25
- Eye and ear protection - $12
- Dust mask - $15
- Masonry/geologist hammer - $30
- Tape measure - $20
- Square - $10
- Thickness gage (D-Meter) - $800+
- Weld gage/V-wac- $10
- Caliper - $100+
- Micrometer - $160+

**Prices obtained from Grainger.com; tools available from other retailers; prices vary

Equipment


REED TM-8811
0.000
Ultrasonic Thickness Gauge


0.00
Fowler
mm/in/F
HOLD
ON/ZERO
OFF




SWANSON SQUARE
SPEED
HIP-VAL
TOP CUTS
COMMON
DEG.

R

When to Measure

- Consider Measuring when:
  - Laminate rust present
  - Section Loss > 5%
  - Heavy debris build-up
  - Deep or heavy pitting
  - New signs of corrosion
  - Questionable if measurement is required? When in doubt measure.
- Procedure
  - Observe corrosion
  - Scrape/remove laminate rust, dust, debris off
  - Brush clean with wire brush/wheel/cup
  - Use hand broom to clean remaining dust/debris
  - Gather measurement with D-meter, micrometer, calipers, pit gauge, etc

R

When to Measure

- Required to measure when CS4 – Steel
- Primary Superstructure or Substructure Elements
- Structure Inspection Field Manual Chapter 3.A – Structural Review

  - High-shear areas where the average loss of the web exceeds 10% of web thickness or where corrosion holes exist.
  - High-moment areas where the average loss of the flange exceeds 10% of the flange thickness.
  - Tension members where the section loss exceeds 10% of the gross cross-sectional area.
  - Compression members of arches or trusses where the section loss exceeds 10% of the gross cross-sectional area.
  - Piles or columns where the section loss exceeds 15% of the gross cross-sectional area.

- Measurements are required when approaching CS4 – meaning at CS3!
- Estimation is no longer acceptable!

R

Location

- Critical locations:
  - Web sections near bearings at abutments and piers
  - Lower and upper flanges near midspan
  - Upper and Lower flanges and web sections on continuous beams over piers
  - NSTM (Fracture Critical) Members
  - Steel Pile
- Other locations should be noted and measured when necessary

R

Accuracy

- Ensure D-Meter calibration; most come with calibration block
  - Ensure proper frequency of ultrasonics for material: steel, aluminum, etc.
- D-Meters require smooth surface
  - Likely need to grind smooth, or measure from opposite side
- Sweep clean
- Gather measurement

R

Reporting

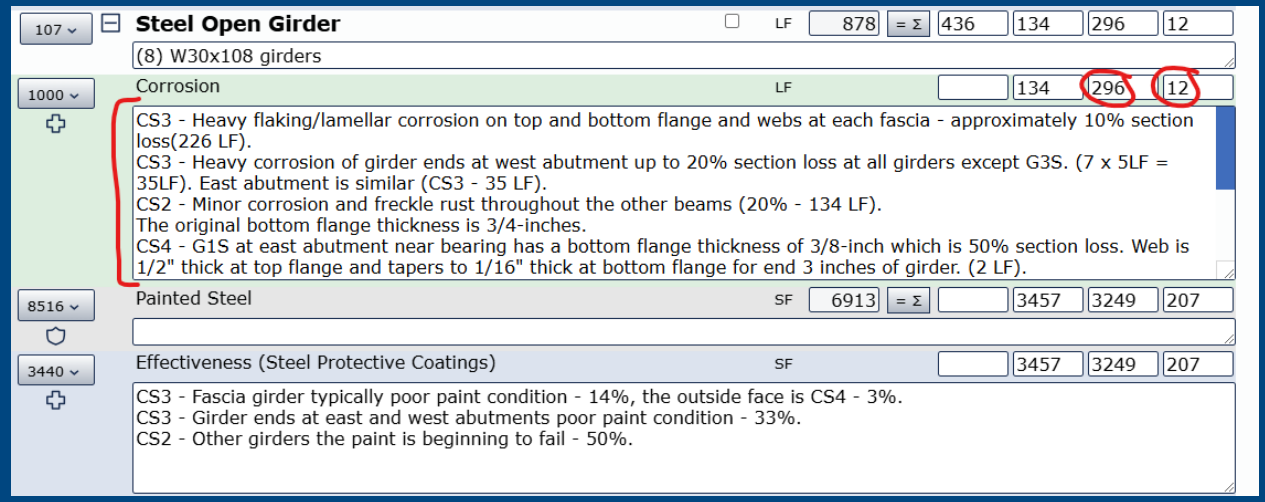
Why do we need to report?

- Documentation – Historical data for the next inspection
  - Does the corrosion get worse?
  - How fast is the element degrading?
- Load Rating – Can the bridge experience the expected traffic?
  - Accurate and detailed measurements allows for accurate load rating

R

Reporting

- Report field measurements in notes
- Gather data from plans (if available)
- If no known plans available, gather data from remaining girder
  - Provide estimated size (3/8” flange or web; W10x22, etc)
- Report conditions in HSI
  - Location
  - Thickness
  - ~% section loss/remaining
  - Length of condition



R

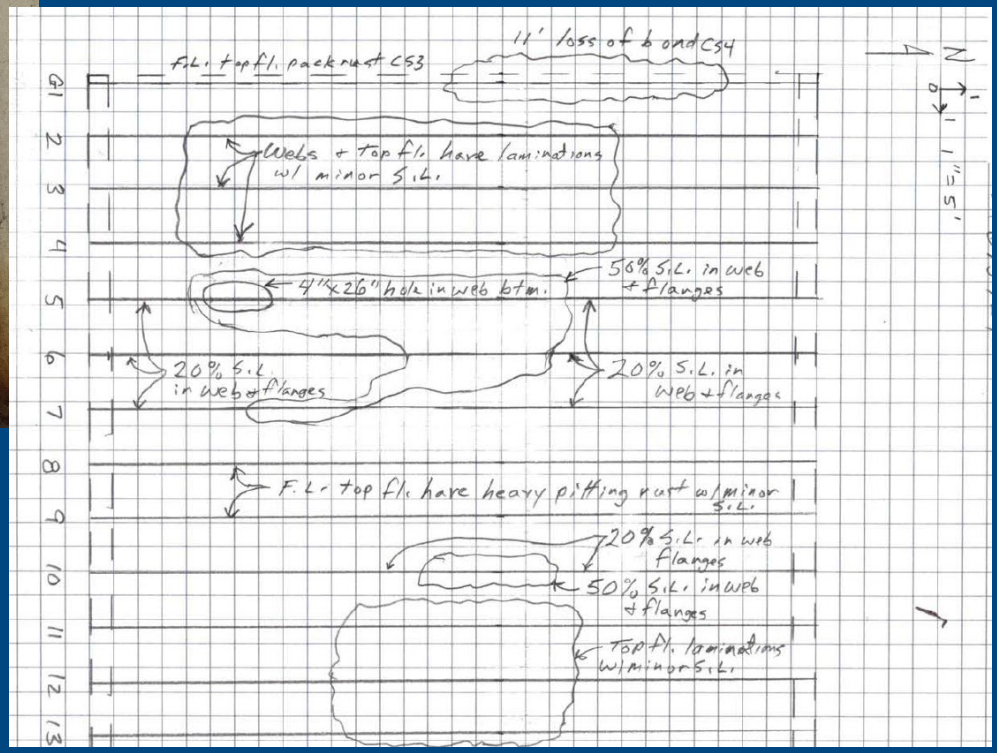
Reporting

- Details, Details, Details!
- List out locations by Span #, Girder #, Location on girder, etc
- Report amount of section loss in area
- Example: “Span 1, Girder 1 at west abutment exhibits 23% section loss in web for appx 1.2 ft from centerline of bearing.”
- Specific details allow for accurate load rating
- Sketches of field findings and annotated photos help load rating engineers and ability to track changes over time
- Separate web section from top flange from bottom flange, as they carry different forces

Documentation

Annotated Photos

Sketch of findings



Documentation

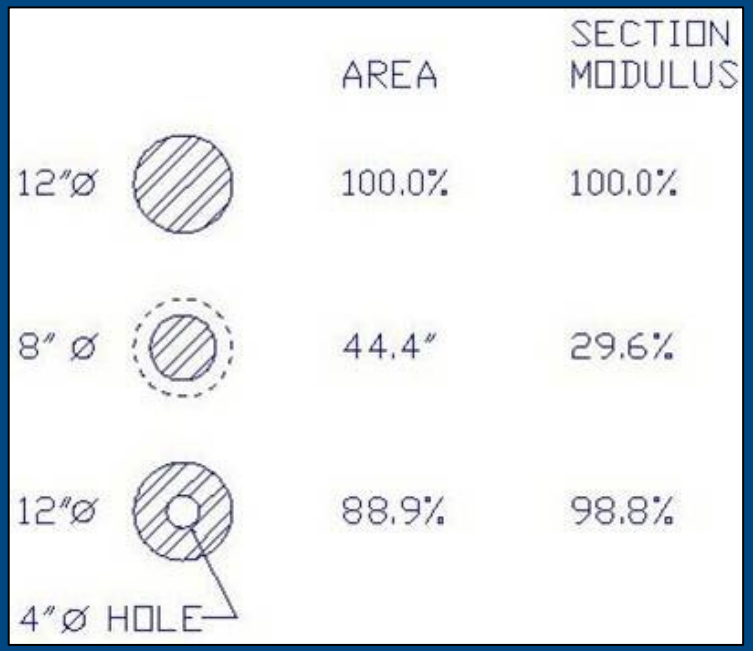
R

X	107		**Steel Open Girder**	LF	1,224	0	**612**	**153**	**459**
			4 beams @ 33" depth, flange normal depth 7/8" **Span 1 - 1 splice, span 2 - 2 splices, span 3 - 2 splices, span 4 - 1 splice** **Span 1 68 LF, Span 2 85 LF, Span 3 85 LF, Span 4 68 LF**					
		1000	Corrosion	LF		0	**612**	**153**	**459**
			Span 1 - **G1 West end** outside **bottom flange has lost 2/3 of section - 6 LF, remaining thickness 1/4". Remainder of span 1 G1 has section loss to lower web, web areas under rail support connections and outside bottom flange.** Web stiffeners **at abutment and pier** have complete section loss near bottom flange **= 68 LF - CS4** **G4 - has slight section loss to lower web, web areas under rail support connections and outside bottom flange - 68 LF - CS3** **G2 & G3 have freckled rust - 136 LF - CS2** **Span 2 - G1** has **6"** hole in web **East of** splice connection **1, remainder of** span 2 G1 has section loss to **lower web, web areas under rail support connections and outside bottom flange. Web stiffener over pier has complete section loss near** bottom flange **= 85 LF - CS4** **G4 - has slight section loss to lower web,** web areas **under rail support connections and outside** bottom flange **- 85 LF - CS3** **G2 & G3 have freckled rust - 170 LF - CS2** **Span 3 - G1 has section loss to lower web, web areas under rail support connections and outside bottom flange. Web stiffener over pier has complete section loss near bottom flange = 85 LF - CS4** **G4 - has moderate section loss to lower web, web areas under rail support connections and outside bottom flange - 85 LF - CS4, G2 & G3 have freckled rust - 170 LF - CS2** **Span 4 - G1 has 6" hole in web East of splice connections, remainder of** span **4 G1 has section loss to lower web, web areas under rail support connection and outside bottom flange. Web stiffeners at abutment and pier have complete section loss near bottom flange = 68 LF - CS4** **G4 - has 6" hole in web on East side of splice connection and 1' hole in bottom outside flange 19' from East abutment. Flange in area bends easily with hammer 4 LF.** Outside web stiffeners over pier 3 and at East abutment have complete section loss **near bottom flange. East end outside** bottom flange **has 80% section loss from 3/4** span to end **in places = 68 LF - CS4** **G2 & G3 have freckled rust - 136 LF - CS2**					

R

Measurement vs. Estimation

- Estimation is allowable when gross section loss is < or = 5%
- An estimation of 5% may actually be 2% or 10%
- Section loss % should be total section, not just minimum
- Drawings are helpful for the next inspector and for the load rating engineers



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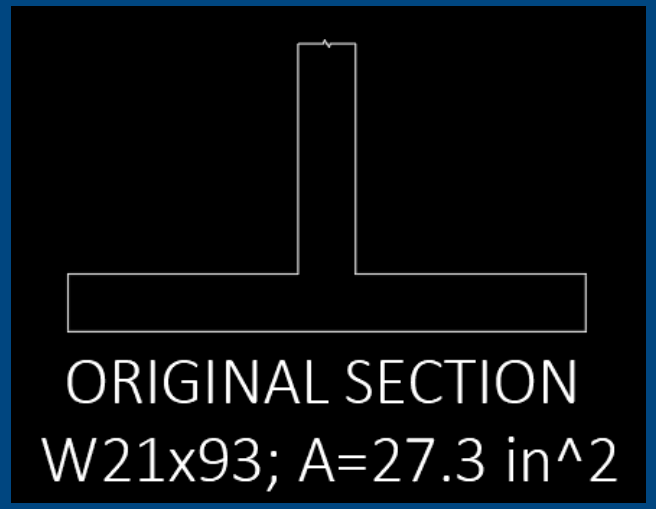
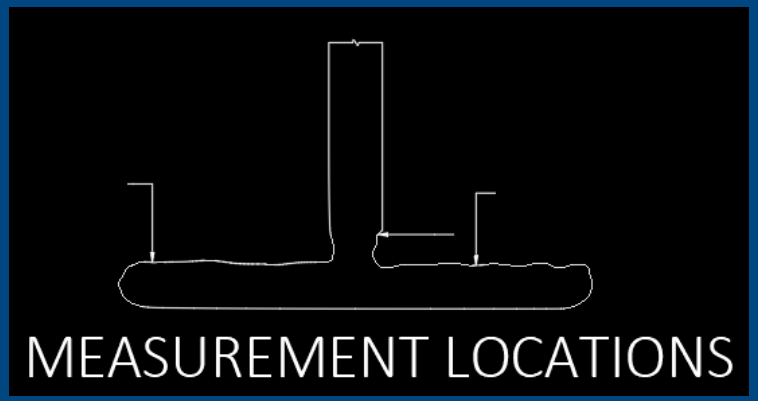
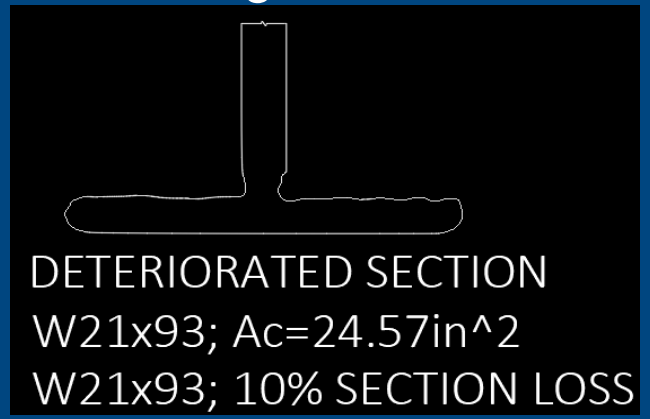
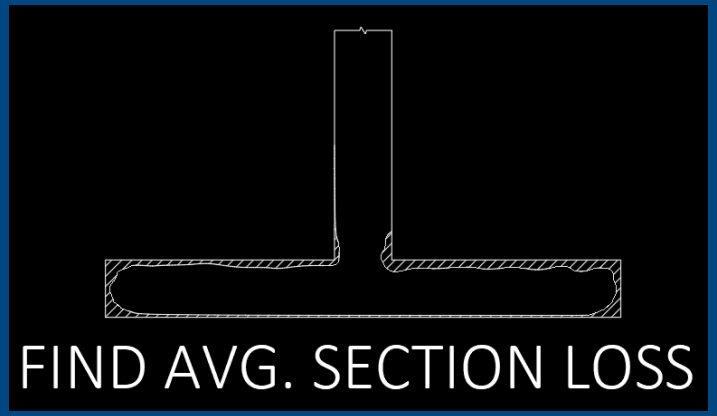
Measurement vs. Estimation

- If plans available, note what beam size
- Take measurements of section loss
- Find remaining area
- Report total section loss in web/flange/etc









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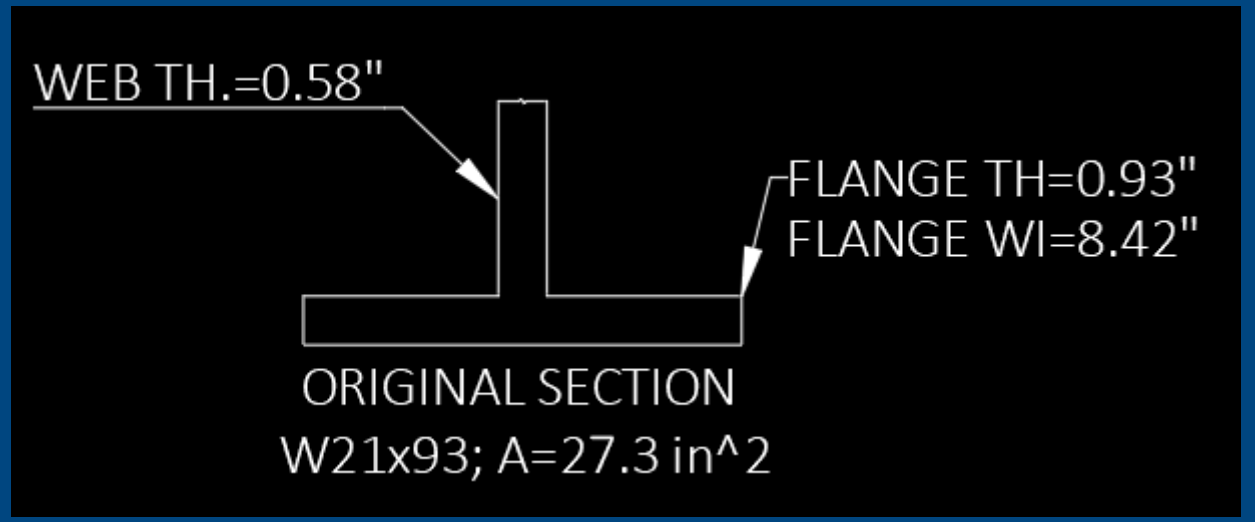
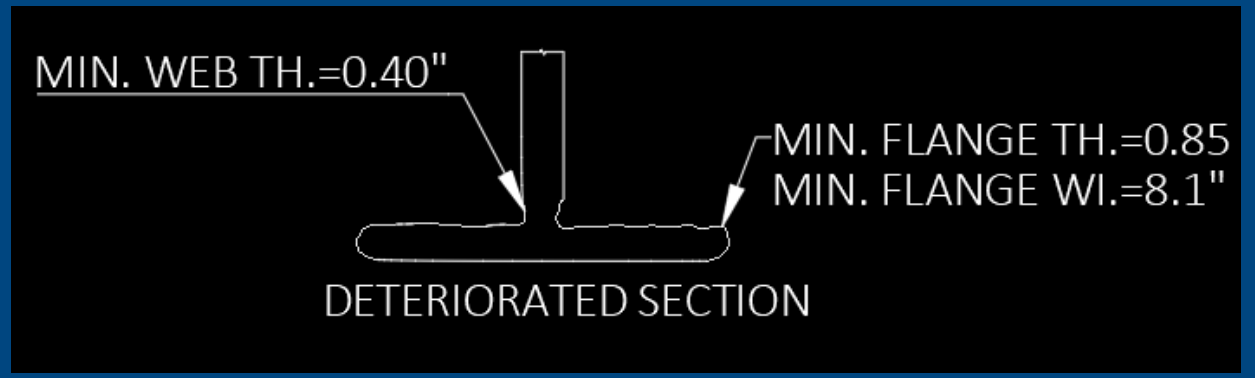
Example

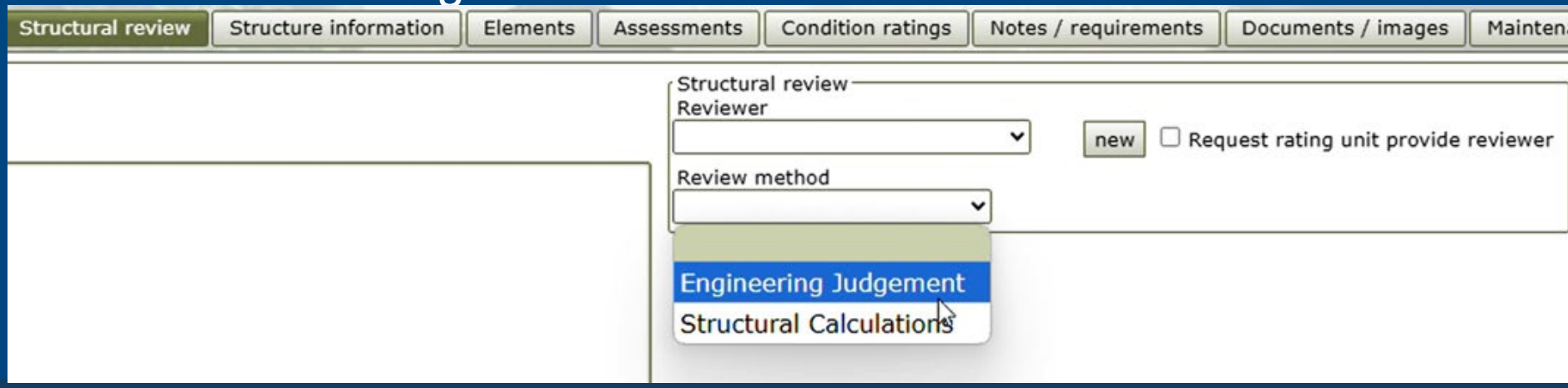
- Compare original with deteriorated sections
- Calculate % loss
- 8.42”x0.93”=7.83” Flange original
- 8.1”x0.85”=6.87” Flange remaining
- 6.87/7.83=0.877; 87.7% remaining
- Flange section loss = 12.3%
- Total section loss = 3.5% aggregate





When to Load Rate

- When corrosion is bad enough, the structure can no longer carry the original design loads – elevate to a load rating engineer
- (2) ways of performing Structural Review (any increase in CS4 quantity)
  - Engineering Judgement
  - Structural Calculations
- When in doubt, elevate to load rating



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Elevate to Load Rating

- When a load rating is needed:
  - Alex Pence, Load Rating Unit Supervisor
    608-267-6880
    Alex.pence@dot.wi.gov
  - Contact Region PM with email or cc when contacting Load Rating Unit
  - *Critical Findings* need to be alerted to the Region PM and State PM

R

Examples


SEP 30 2002


SEP 7 2006


WEIGHT
LIMIT
3
TONS
VEHICLE LIMIT
STEEL
DECK
BRIDGE

Bridge A

R

Reasonable Course of Action?

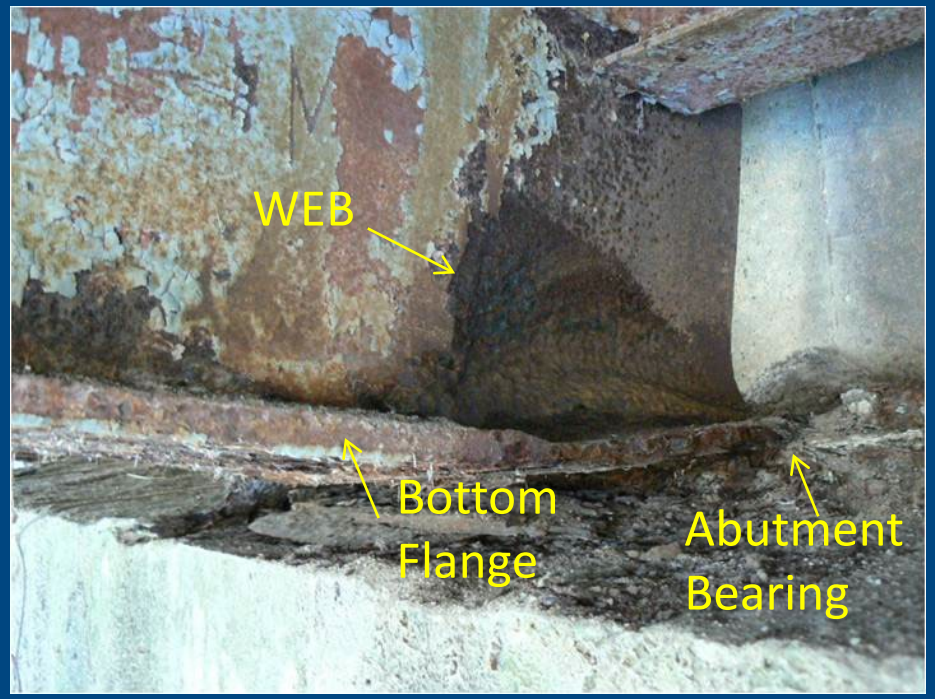
R

Bridge B

Reasonable Course of Action?

R

Bridge C



Reasonable Course of Action?

Knowledge Check

What must an inspector do to get adequate Section Loss measurements?

Remove rust/corrosion to bare steel

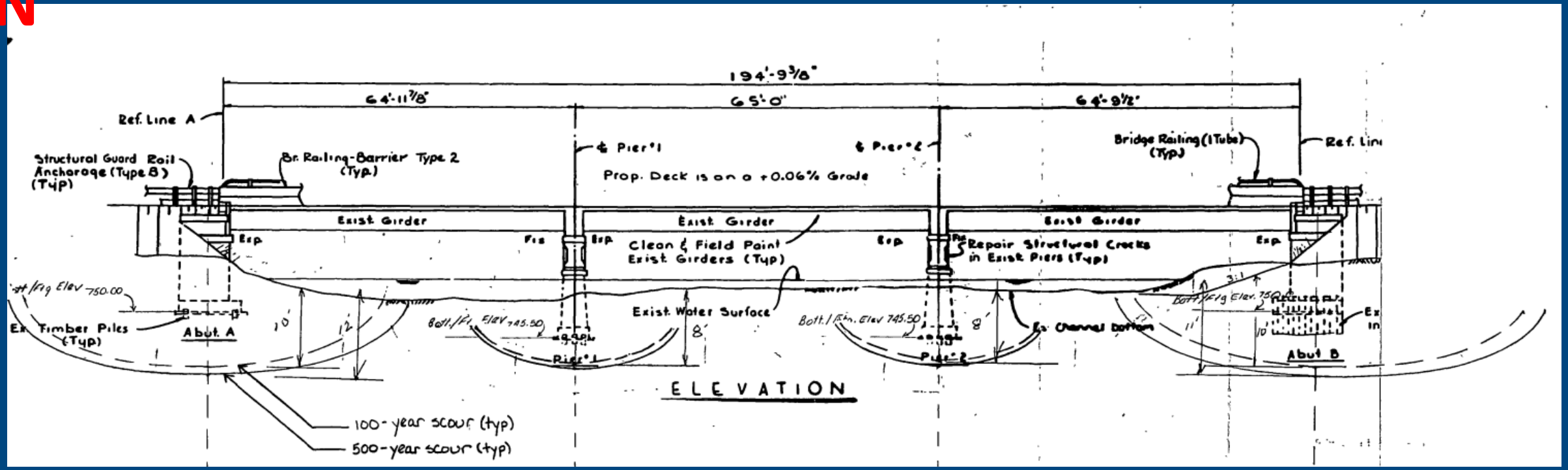
Wisconsin DOT High Flow Event Monitoring Tool

Anthony Stakston

Bridge Maintenance Engineer

2025 Structure Inspection Refresher Training Online

March 19, 2025



Scour Critical Bridges

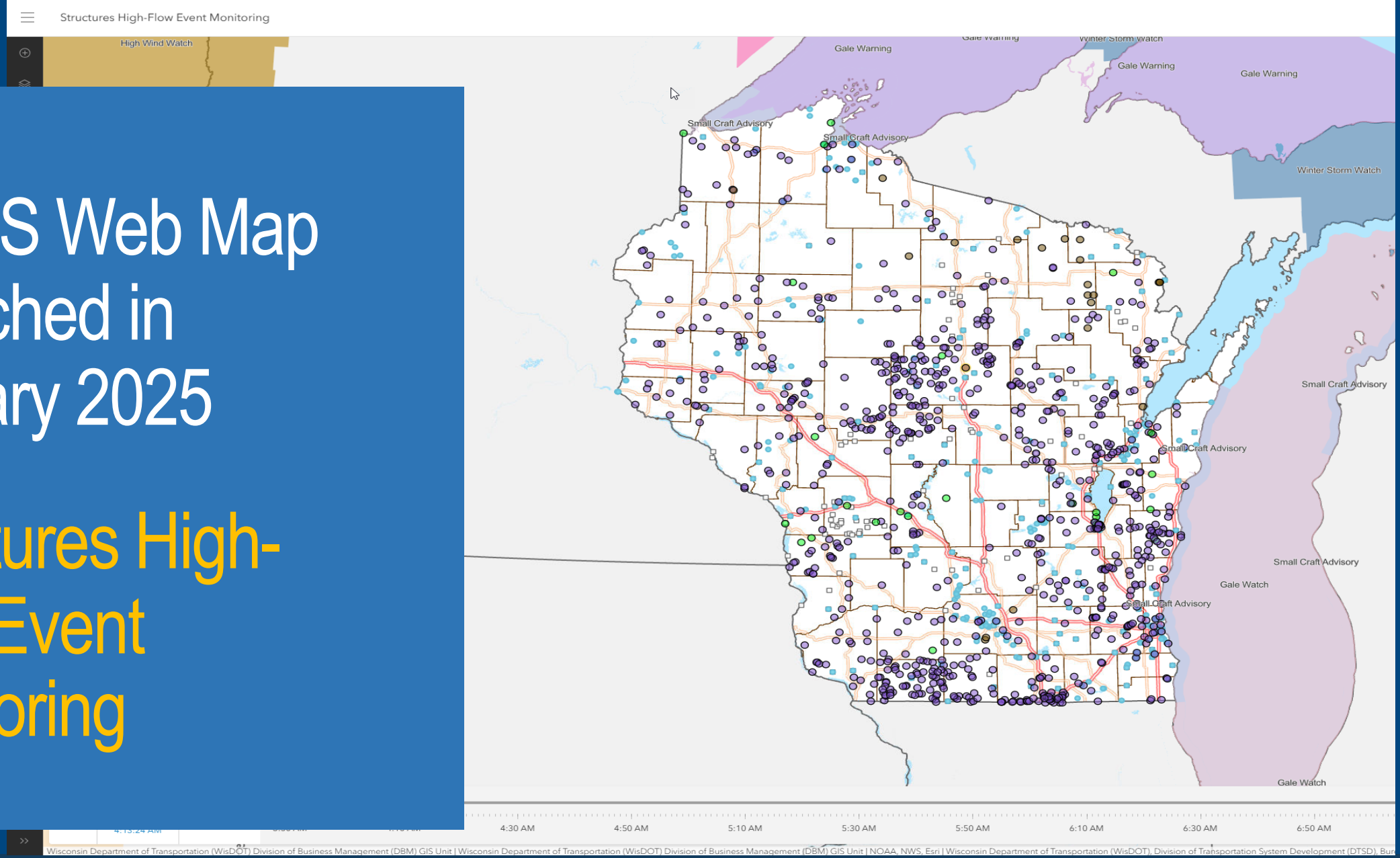
812 Bridges (21 Federal, 25 State, 758 Local & 8 Private)

Additional bridges identified in the near future,

because an existing BOS project to complete new scour evaluations.

ArcGIS Web Map Launched in January 2025

Structures High-Flow Event Monitoring



WISCONSIN DEPARTMENT OF TRANSPORTATION

BUREAU OF STRUCTURES

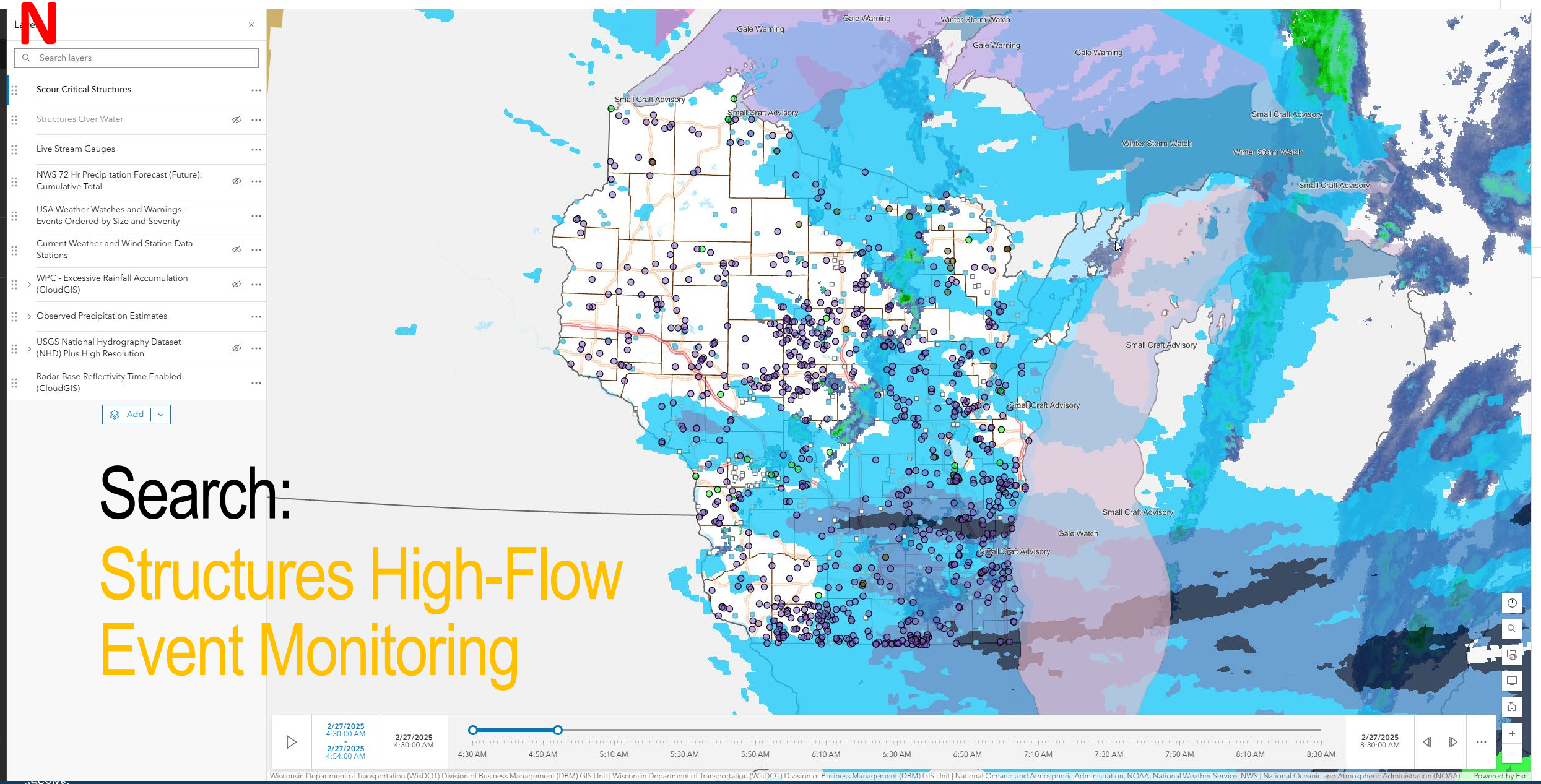
Identify the Need

- Several sources of information to pull together the overall picture of the event
  - Map of scour critical bridges throughout the Region / County (HSIS).
  - USGS stream gage data (USGS website)
  - Precipitation data & Weather Watches / Warning (NOAA)
  - Watershed maps (USGS)
  - Radar imagery (any weather app)
- Long processing time, inefficient especially during a high-risk situation.

N

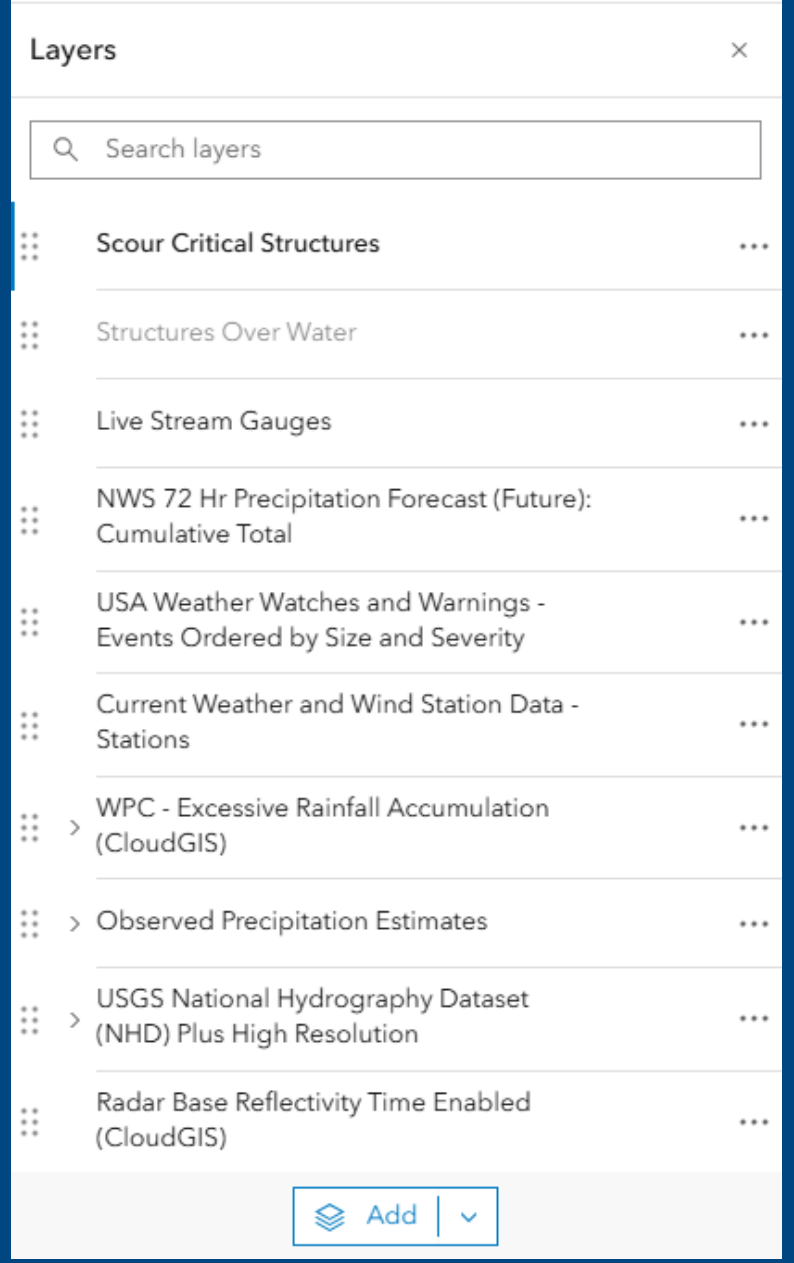
The Solution

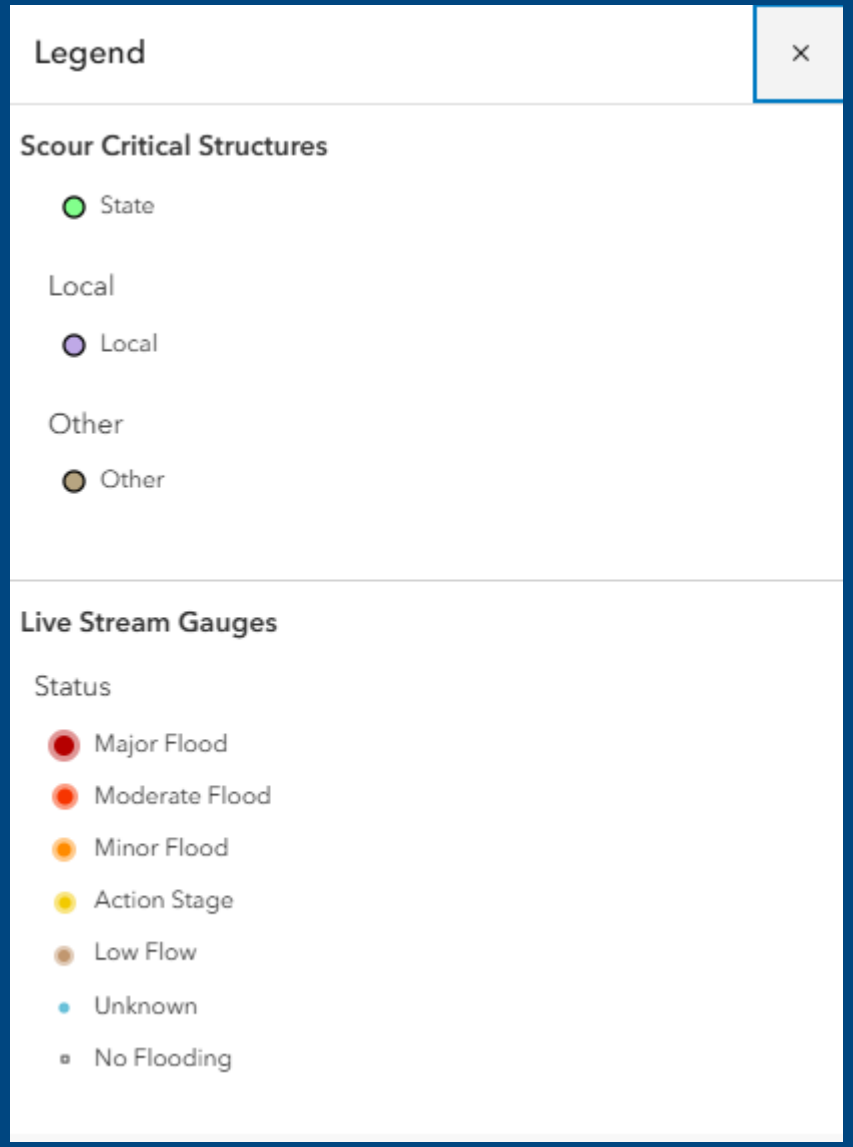
- WisDOT GIS team spearheaded development
  - ESRI ArcGIS Online platform
  - Geospatial representation of all scour critical bridges
    - 3, 2, 1, 0 and U (Unknown Foundation) – Will be updated to new scour vulnerability codes: 0, C, D, E & U
  - Watershed and sub basin boundaries
  - Live reference to USGS stream gage data
  - Excessive Rainfall Accumulation Day 1 – 5
  - 72 Hr Precipitation Forecast (Future)
  - Radar Imagery
  - Watches and warnings
  - Geographic boundaries of WisDOT Regions

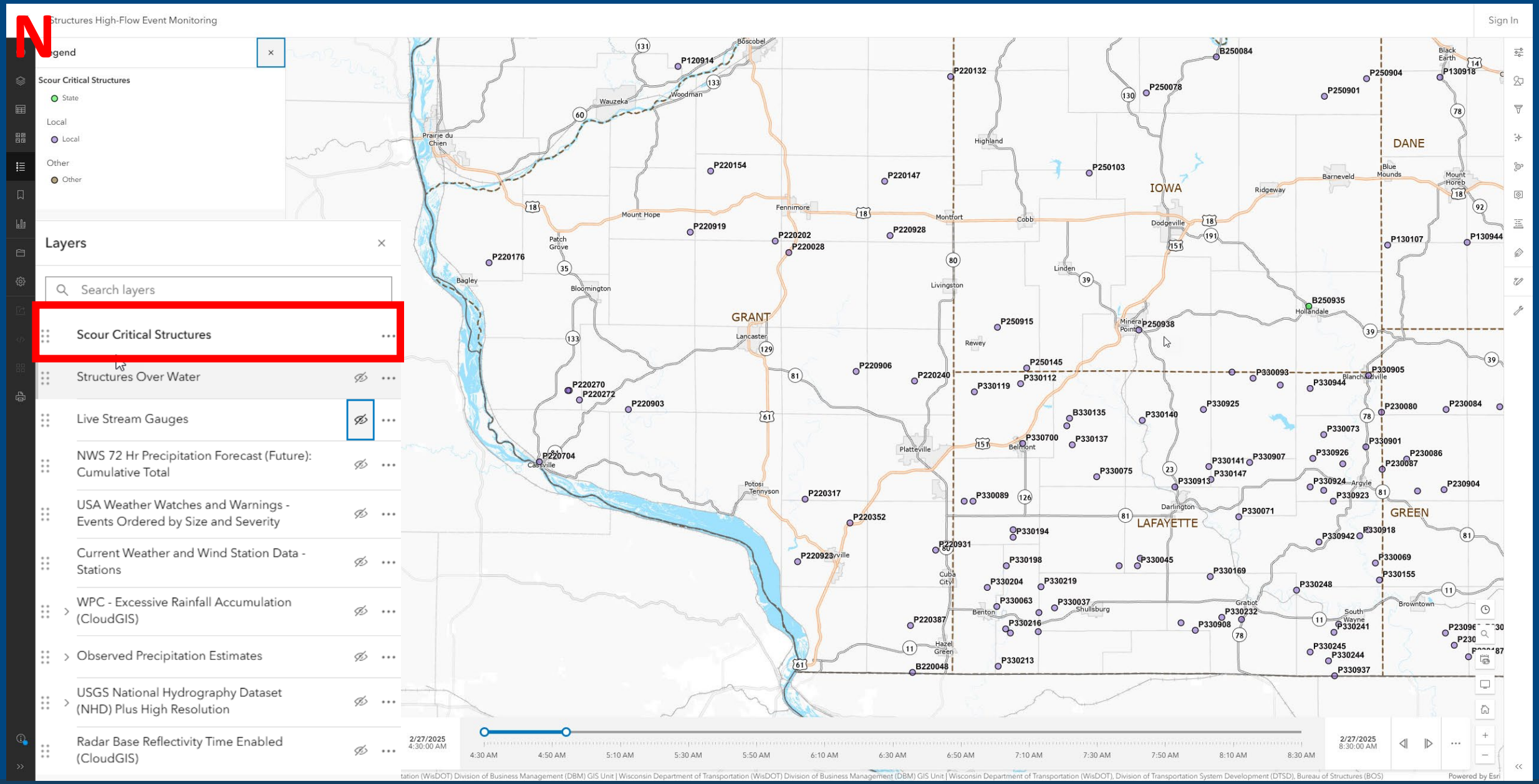


Search:

Structures High-Flow Event Monitoring


Layers
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
NWS 72 Hr Precipitation Forecast (Future): Cumulative Total
USA Weather Watches and Warnings - Events Ordered by Size and Severity
Current Weather and Wind Station Data - Stations
WPC - Excessive Rainfall Accumulation (CloudGIS)
Observed Precipitation Estimates
USGS National Hydrography Dataset (NHD) Plus High Resolution
Radar Base Reflectivity Time Enabled (CloudGIS)
Add


Legend
Scour Critical Structures
State
Local
Local
Other
Other
Live Stream Gauges
Status
Major Flood
Moderate Flood
Minor Flood
Action Stage
Low Flow
Unknown
No Flooding


Structures High-Flow Event Monitoring
Sign In
Legend
Scour Critical Structures
State
Local
Local
Other
Other
Layers
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
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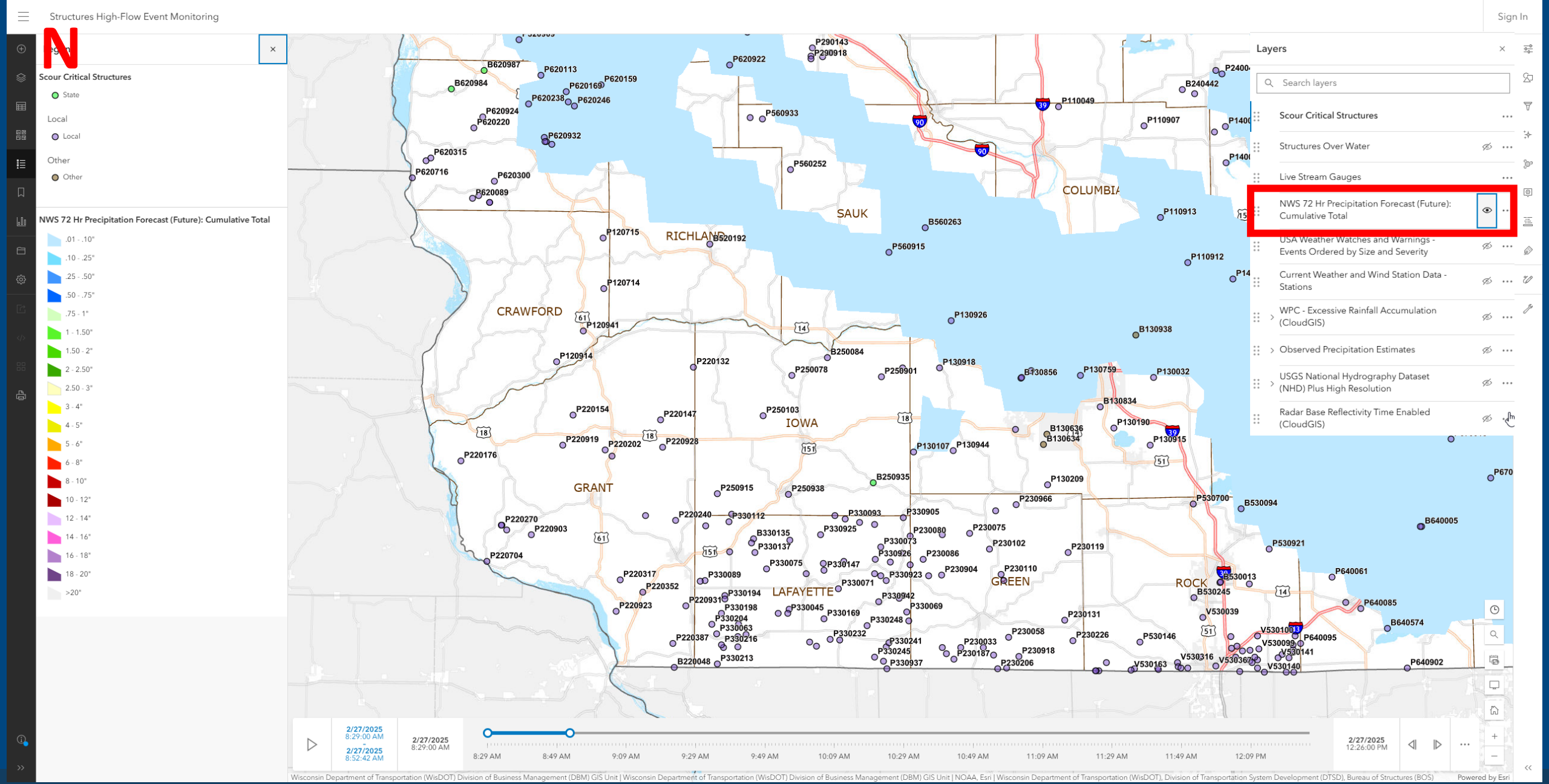
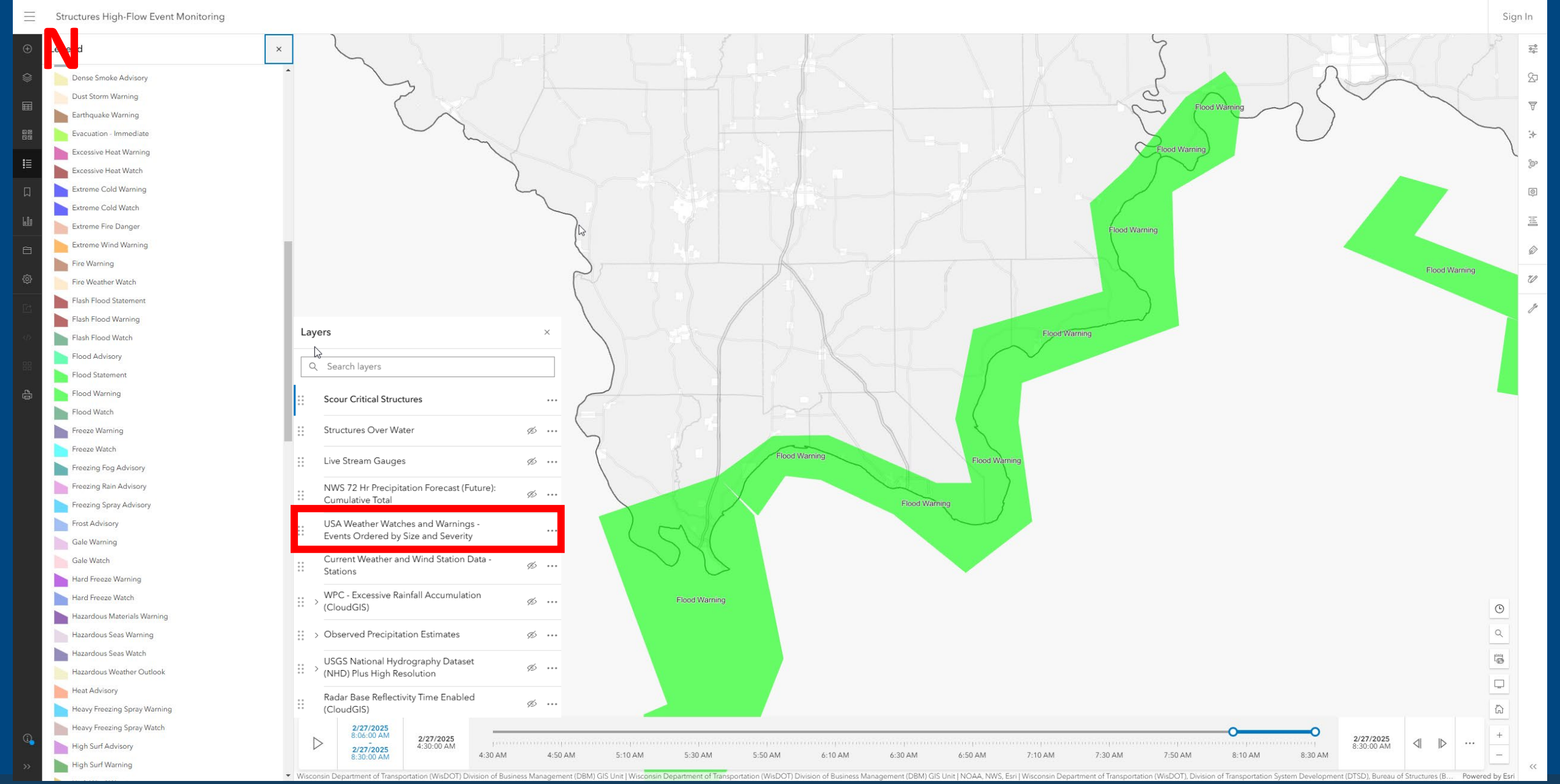
Radar Base Reflectivity Time Enabled (CloudGIS)
GRANT
IOWA
DANE
LAFAYETTE
GREEN
2/27/2025 4:30:00 AM
2/27/2025 8:30:00 AM
Powered by Esri


Structures High-Flow Event Monitoring
Sign In
Scour Critical Structures
State
Local
Local
Other
Other
NWS 72 Hr Precipitation Forecast (Future): Cumulative Total
.01 - .10"
.10 - .25"
.25 - .50"
.50 - .75"
.75 - 1"
1 - 1.50"
1.50 - 2"
2 - 2.50"
2.50 - 3"
3 - 4"
4 - 5"
5 - 6"
6 - 8"
8 - 10"
10 - 12"
12 - 14"
14 - 16"
16 - 18"
18 - 20"
>20"
Layers
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
NWS 72 Hr Precipitation Forecast (Future): Cumulative Total
USA Weather Watches and Warnings - Events Ordered by Size and Severity
Current Weather and Wind Station Data - Stations
WPC - Excessive Rainfall Accumulation (CloudGIS)
Observed Precipitation Estimates
USGS National Hydrography Dataset (NHD) Plus High Resolution
Radar Base Reflectivity Time Enabled (CloudGIS)
SAUK
COLUMBIA
RICHLAND
CRAWFORD
IOWA
GRANT
LAFAYETTE
GREEN
ROCK
2/27/2025 8:29:00 AM - 2/27/2025 8:52:42 AM
2/27/2025 8:29:00 AM
8:29 AM
8:49 AM
9:09 AM
9:29 AM
9:49 AM
10:09 AM
10:29 AM
10:49 AM
11:09 AM
11:29 AM
11:49 AM
12:09 PM
2/27/2025 12:26:00 PM
Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | NOAA, Esri | Wisconsin Department of Transportation (WisDOT), Division of Transportation System Development (DTSD), Bureau of Structures (BOS)
Powered by Esri


Structures High-Flow Event Monitoring
Sign In
Dense Smoke Advisory
Dust Storm Warning
Earthquake Warning
Evacuation - Immediate
Excessive Heat Warning
Excessive Heat Watch
Extreme Cold Warning
Extreme Cold Watch
Extreme Fire Danger
Extreme Wind Warning
Fire Warning
Fire Weather Watch
Flash Flood Statement
Flash Flood Warning
Flash Flood Watch
Flood Advisory
Flood Statement
Flood Warning
Flood Watch
Freeze Warning
Freeze Watch
Freezing Fog Advisory
Freezing Rain Advisory
Freezing Spray Advisory
Frost Advisory
Gale Warning
Gale Watch
Hard Freeze Warning
Hard Freeze Watch
Hazardous Materials Warning
Hazardous Seas Warning
Hazardous Seas Watch
Hazardous Weather Outlook
Heat Advisory
Heavy Freezing Spray Warning
Heavy Freezing Spray Watch
High Surf Advisory
High Surf Warning
Layers
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
NWS 72 Hr Precipitation Forecast (Future): Cumulative Total
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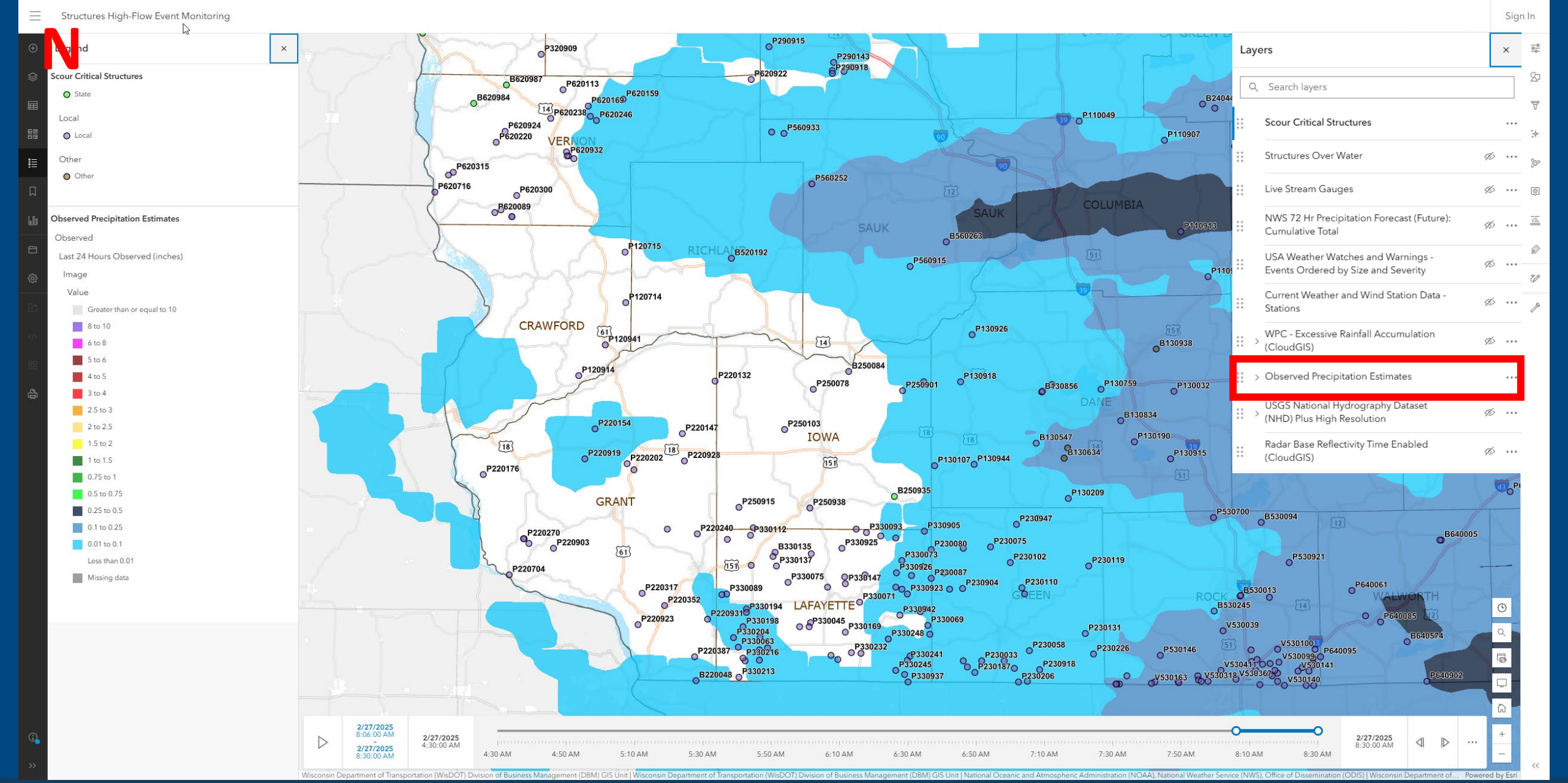
WPC - Excessive Rainfall Accumulation (CloudGIS)
Observed Precipitation Estimates
USGS National Hydrography Dataset (NHD) Plus High Resolution
Radar Base Reflectivity Time Enabled (CloudGIS)
Flood Warning
2/27/2025 8:06:00 AM
2/27/2025 8:30:00 AM
2/27/2025 4:30:00 AM
4:30 AM
4:50 AM
5:10 AM
5:30 AM
5:50 AM
6:10 AM
6:30 AM
6:50 AM
7:10 AM
7:30 AM
7:50 AM
8:10 AM
8:30 AM
2/27/2025 8:30:00 AM
Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | NOAA, NWS, Esri | Wisconsin Department of Transportation (WisDOT), Division of Transportation System Development (DTSD), Bureau of Structures (B...
Powered by Esri


Structures High-Flow Event Monitoring
Sign In
Legend
Scour Critical Structures
State
Local
Local
Other
Other
Observed Precipitation Estimates
Observed
Last 24 Hours Observed (inches)
Image
Value
Greater than or equal to 10
8 to 10
6 to 8
5 to 6
4 to 5
3 to 4
2.5 to 3
2 to 2.5
1.5 to 2
1 to 1.5
0.75 to 1
0.5 to 0.75
0.25 to 0.5
0.1 to 0.25
0.01 to 0.1
Less than 0.01
Missing data
Layers
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
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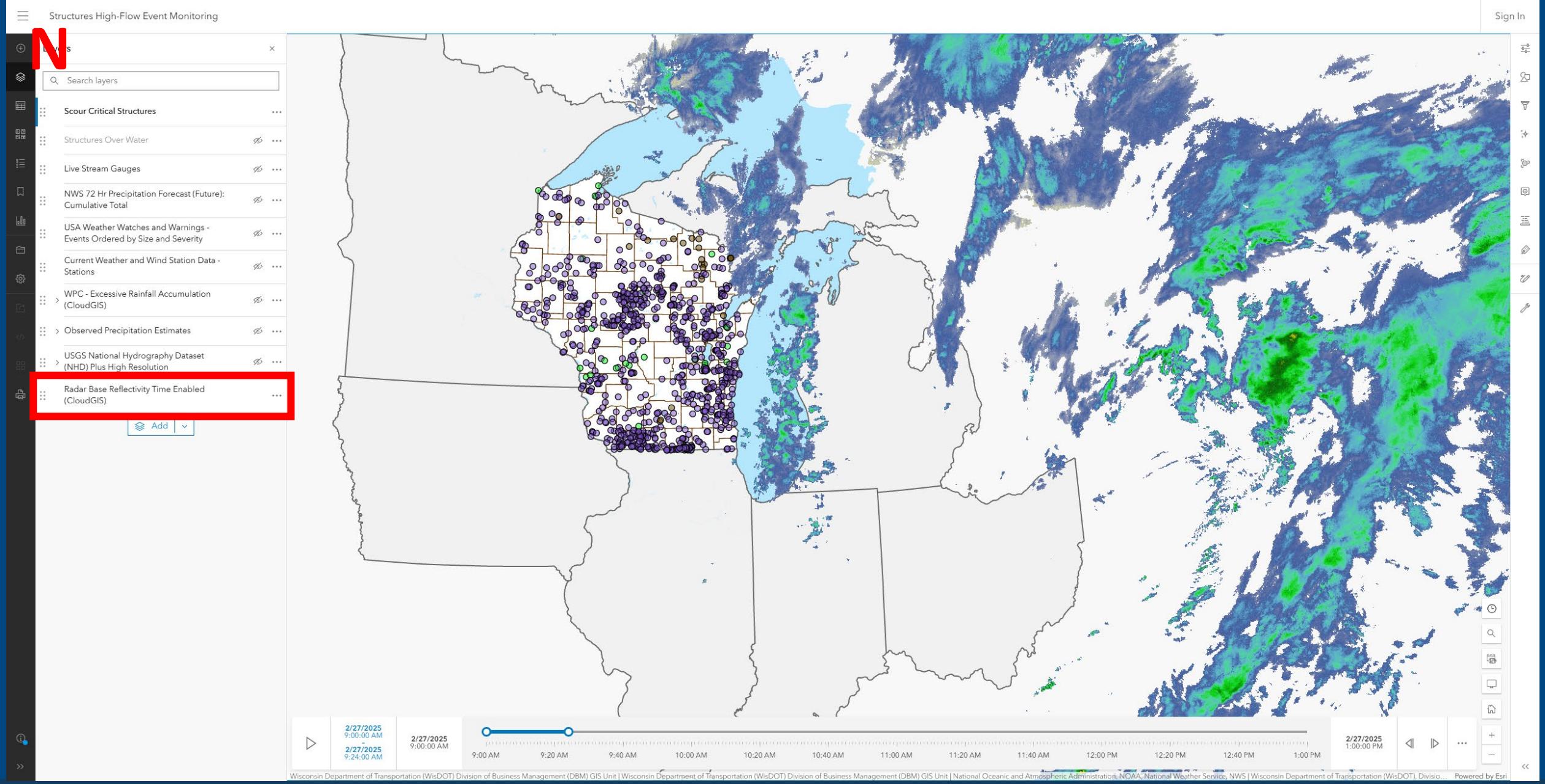
Observed Precipitation Estimates
USGS National Hydrography Dataset (NHD) Plus High Resolution
Radar Base Reflectivity Time Enabled (CloudGIS)
VERNON
CRAWFORD
RICHLAND
SAUK
COLUMBIA
DANE
IOWA
GRANT
LAFAYETTE
GREEN
ROCK
WALWORTH
2/27/2025 8:06:00 AM - 2/27/2025 8:30:00 AM
2/27/2025 4:30:00 AM
2/27/2025 8:30:00 AM
4:30 AM
4:50 AM
5:10 AM
5:30 AM
5:50 AM
6:10 AM
6:30 AM
6:50 AM
7:10 AM
7:30 AM
7:50 AM
8:10 AM
8:30 AM
Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Office of Dissemination (ODIS) | Wisconsin Department of... Powered by Esri


Structures High-Flow Event Monitoring
Sign In
N
Search layers
Scour Critical Structures
Structures Over Water
Live Stream Gauges
NWS 72 Hr Precipitation Forecast (Future): Cumulative Total
USA Weather Watches and Warnings - Events Ordered by Size and Severity
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WPC - Excessive Rainfall Accumulation (CloudGIS)
Observed Precipitation Estimates
USGS National Hydrography Dataset (NHD) Plus High Resolution
Radar Base Reflectivity Time Enabled (CloudGIS)
Add
2/27/2025 9:00:00 AM - 2/27/2025 9:24:00 AM
2/27/2025 9:00:00 AM
9:00 AM
9:20 AM
9:40 AM
10:00 AM
10:20 AM
10:40 AM
11:00 AM
11:20 AM
11:40 AM
12:00 PM
12:20 PM
12:40 PM
1:00 PM
2/27/2025 1:00:00 PM
Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | Wisconsin Department of Transportation (WisDOT) Division of Business Management (DBM) GIS Unit | National Oceanic and Atmospheric Administration, NOAA, National Weather Service, NWS | Wisconsin Department of Transportation (WisDOT), Divisio...
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N

- With this information, the inspectors can:
  - Quickly identify if a scour critical bridge is on a watercourse in flood stage
  - Determine if more precipitation is coming
  - Reference the stream gages to determine if flow is rising, peaking, or falling
  - Determine how much cumulative precipitation has fallen and compare to past events
  - Review the watershed boundaries to estimate contributing flow to watercourse, and which structures will be affected

N

- No alerts through this program
  - Stream gage alerts through WaterAlert - USGS
  - Watches and warnings - NOAA
- Ideally would have a stream gage at each scour critical bridge
- Info not referenced
  - Scour action plans
  - As-builts
  - Underwater inspections

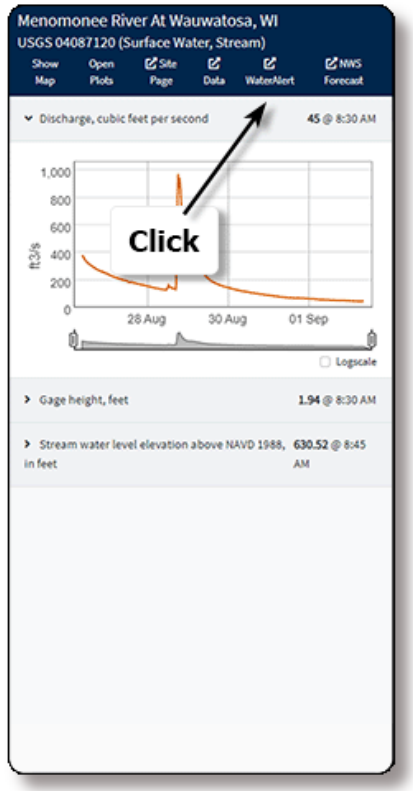
USGS WaterAlert

1 Find a monitoring location.

Use National Water Dashboard.

2 Tell WaterAlert which monitoring location.

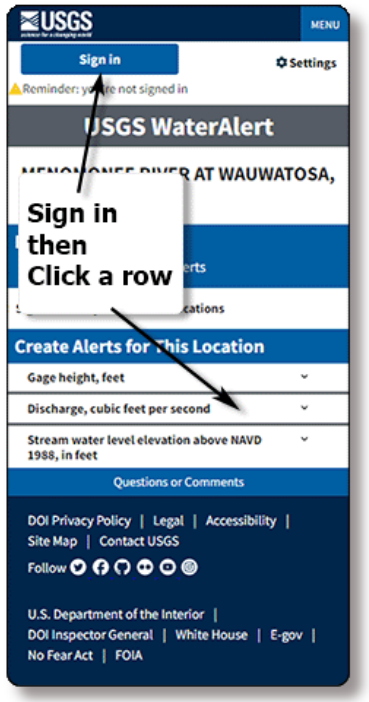
Use National Water Dashboard to connect with WaterAlert.



USGS WaterAlert

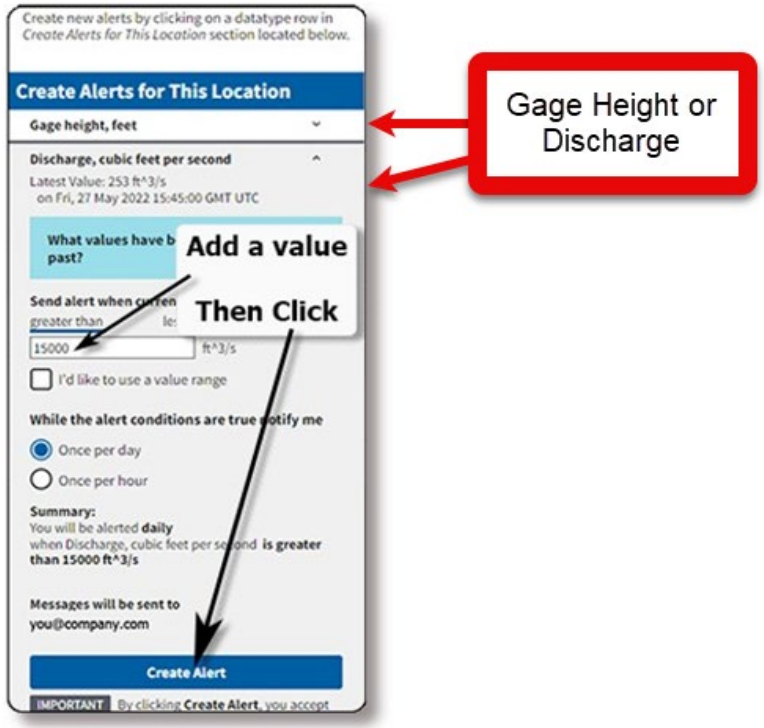
3 Select a water condition in which you have an interest.

In WaterAlert, sign in then click one of the water conditions rows - which water conditions are available is dependent on the sensors at the selected monitoring location.



4 Set your thresholds.

Enter a threshold value, click *Create alert* and you're done! WaterAlert will send you a notification when water conditions match your thresholds. In the meantime, check out the User Guide.



N

- High Flow Site Visit
  - https://www.arcgis.com/home/item.html?id=1671e9905341647eb80ad40166bb8b956

Or Search:
Structures High Flow Event Monitoring

QUESTIONS?

Thank you for participating.

Contact information:
David Bohnsack
BOS Maintenance Section
David.bohnsack@dot.wi.gov
(608) 785-9781 or (608) 792-6084

Coverage	Name	Phone	Cell	Email	Role
Statewide	David Bohnsack	608-785-9781	608-792-6084	David.bohnsack@dot.wi.gov	Statewide Program Manager
Statewide	Matt Coupar	608-266-5083		Matthew.Coupar@dot.wi.gov	Assistant Statewide Program Manager
North Unit	Greg Haig	715-492-8757		Gregory.haig@dot.wi.gov	Inspection & Maintenance Unit A (NC, NE, NW Region) Supervisor
South Unit	Julie Brooks	262-521-4431	414-750-1539	Julie.brooks@dot.wi.gov	Inspection & Maintenance Unit B (SE, SW Region) Supervisor
Insp & Repair Unit	Jason Lahm	920-492-5998	920-360-2374	Jason.lahm@dot.wi.gov	Structure Inspection & Repair Unit Supervisor
Statewide	Steve Doocy	608-261-6063		Steve.doocy@dot.wi.gov	Statewide Ancillary Inspection Program Manager
Statewide	Anthony Stakston	715-421-8345	715-459-2624	anthony.stakston@dot.wi.gov	Statewide Structures Maintenance Program Manager
Statewide	Ryan Bowers	608-267-3577		Ryan.bowers@dot.wi.gov	Bridge Management Engineer / HSI Contact
SE Region	Scott Reay	262-548-6715	414-750-1504	Scott.reay@dot.wi.gov	SE Region Bridge Inspection Program Manager
SW Region- Madison	Michael Williams	608-516-6484	608-246-3250	michael.williams@dot.wi.gov	SW Region Bridge Inspection Program Manager
SW Region-La Crosse	Craig Fisher	608-785-9946	608-668-1390	Craig.fisher@dot.wi.gov	SW Region Bridge Inspection Program Manager
NC Region	Mariah Krueger	715-421-7380	715-315-2680	Mariah.krueger@dot.wi.gov	NC Region Bridge Inspection Program Manager
NE Region	Brady Rades	920-492-4152	920-366-5684	Brady.rades@dot.wi.gov	NE Region Bridge Inspection Program Manager
NW Region-Superior	Travis McDaniel	608-266-5097	608-419-8672	travis.mcdaniel@dot.wi.gov	NW Region Bridge Inspection Program Manager
NW Region-Eau Claire	Kyle Harris	715-579-3516	715-579-3516	Kyle.harris@dot.wi.gov	NW Region Bridge Inspection Program Manager
FHWA	Joe Balice	608-829-7528	608-609-5025	Joe.balice@dot.gov	FHWA Bridge Engineer