# Quality Assurance Review

## National Bridge Inspection Standards &
## Bridge Maintenance Program

## Putnam County

## October 4, 2022

By: Mark Sherman, PE
CEAO Federal Bridge QA/QC Engineer

The scope of this review is to evaluate the agency's bridge inspection program based upon The Ohio Revised Code, the ODOT Manual of Bridge Inspection (MBI), and the
National Bridge Inspection Standards (NBIS). This includes the following checklist, interviews with staff members responsible for the inspection program, review of files and documentation, and field inspection of bridges. Note: the inspection program includes inventory, maintenance and load rating in addition to the field inspections.

**Agency:** Putnam County Engineer's Office

**DATE:** 9/22/2022

**Questionnaire Completed by:** Michael L Lenhart, P.E., P.S., Putnam County Engineer

## *I. MAINTENANCE, REHABILITATION AND REPLACEMENT PROGRAM*

### A. NUMBER OF BRIDGES WITH MAINTENANCE RESPONSIBILITY

1. Greater than 20' long (NBIS length 23CFR 650c) **(Metric 22)** **162**

2. Bridges >= 10' and <= 20' long **(Metric 22)** **103**

### B. PROCEDURES AND BUDGET

1. Contract repairs and replacement per year

Replacements:(Enter Number): Culverts : 0 Bridges: 1

Rehabilitations (Enter Number): Culverts : 0 Bridges: 1

-List approximate annual budget: $400,000.00

Are Credit Bridge funds used? ☒

Are Fed Funds used? ☒

**2**. In-house repairs and replacements

Replacements:(Enter Number): Culverts : 4 Bridges: 2

Rehabilitations (Enter Number): Culverts : 1 Bridges: 1

List approximate annual budget: $250,000.00

**3**. How are projects identified and selected? Check all that apply.

- ☒ Inspection reports.
- ☒ Sufficiency rating.
- ☒ Growth/development.
- ☐ Other…explain Click or tap here to enter text.

**4**. How are plans developed for emergency repairs? Check all that apply.

- ☒ In-house
- ☒ Consultant
- ☐ Contractor
- ☐ Other explain Click or tap here to enter text.

**5**. Who does the work of emergency repairs? Check all that apply.

- ☒ In house
- ☒ Contractor
- ☐ Other explain Click or tap here to enter text.

**6**. How is repair work documented? (i.e. work record, time card, plans?)

- ☒ Work orders
- ☒ Time Cards
- ☒ Plans

**7**. Who is empowered to order emergency road closures and how is it done?

- ☒ Engineer?
- ☐ Sherriff?
- ☒ Commissioners?

## *II. INSPECTION PROGRAM*

### A. NUMBER OF BRIDGES WITH INSPECTION RESPONSIBILITY

1. Greater than 20’ long (NBIS length, ORC 5501.47, 5543.20) **(Metric 22)**

2. Between 10’ and 20' long (ORC 5501.47, 5543.20) **(Metric 22)**

### B. STAFFING

**1**. Name of individual who is the **Program Manager** (makes FINAL DECISION). List qualifications/yrs. experience (bridge inspection experience) **(Metric 1&2)**

Name: Michael L. Lenhart, P.E., P.S.

- Yrs. Inspection related experience: __21____

- List courses attended (& approx. dates) Ohio Comprehensive Bridge Inspection School – 7/16/2001, Bridge Inspection Refresher Training – 7/12/2017, 2021 Bridge Inspection Updates Webinar – 3/23/2021, Comprehensive Bridge Inspection Refresher Training – 4/30/2022

**2**. Name of individual in charge of bridge inspection unit (**Reviewer**). List qualifications/yrs. experience (bridge inspection experience) **(Metric 1)**

Name: Michael L. Lenhart, P.E., P.S.

- Yrs. Inspection related experience: ___21___

- List courses attended (& approx. dates) Same

**3**. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience) **(Metric 1&3)**

Name: Michael L. Lenhart, P.E., P.S.

- Yrs. Inspection related experience: __21____

- List courses attended (& approx. dates) Same

**C**. Indicate the percentage of time spent on the listed duties in the previous year

%TIME on inspections:

_25__% Bridge/Culvert inspection

_20__% Bridge Design/Plan prep

_5__% Bridge Construction

_5__% Bridge Maintenance

_0__% Overload/Superloads

_0__% Surveying

_45__% Other – Administrative, Road Design, Culvert Design, etc.

___% 100% on Bridges only

**4**. **Load Rating Engineer** – Name of individual responsible for load ratings (must be PE) **(Metric 4)**

a. List Ohio PE # _71261_ b. Name: Michael L. Lenhart, P.E., P.S.

**5**. **Underwater Bridge Inspection Diver** – Name person doing dive inspections **(Metric 5)**

- Name: N/A

- Yrs. Inspection related experience: N/A

- List courses attended (& approx dates ) N/A

**D. INSPECTION EQUIPMENT**

**1. Type of vehicle used for inspections**

- ☒ Pickup truck
- ☐ Van
- ☐ SUV
- ☐ Custom vehicle

**2. What typical inspection equipment does the inspection team normally carry with them to the inspection site? Check all that apply.**

- ☐ Extension Ladder Length ___
- ☐ 100' Fiberglass Tape
- ☒ Geologist Hammer
- ☐ Inspection Mirror
- ☒ Flashlight
- ☐ Thermometer
- ☐ Plumb Bob
- ☒ Camera
- ☐ 2'-0" Level
- ☐ Brush Hook/Axe
- ☐ Boat
- ☐ First Aid Kit
- ☐ Wire Brush
- ☐ 6' Folding Rule
- ☐ Scraper
- ☐ Vertical Clearance Rod
- ☒ Probing Rod
- ☒ Paint Stick/Crayon
- ☒ Hip Boots and Waders
- ☐ Sounding Chains
- ☐ Wrenches
- ☐ Pliers
- ☐ Screw Driver
- ☒ Shovel
- ☐ Calipers

Other equipment not listed above: 30' Tape

**3. List types of NDT methods used? Circle all that apply.**

☐ Dye penetrant; ☐ Magnetic particle; ☐ Ultrasound;

Other N/A

**5. What equipment does your team have available for "hands on" access to <u>FCM</u> bridge members? (Metric 16)**

Same equipment for normal inspections

**6. Use of equipment (Metric 16)**

a. How many bridges need a snooper? None annually

b. How many bridges is it used on? We have used our excavator with a work platform on 2 or 3 bridges in our inventory

c. How often? Occasionally, when needed

**7. Who determines the need for a routine inspection frequency greater than once Annually, and what criteria is used?** (Metric 6)

Explain: **County Engineer, accelerated deterioration, posting changes**

**8. Do you have bridges requiring insp. more frequently than 12 MO** Yes ☐ No ☒

___ Number due to **Damage** Choose an item. List frequency of inspection. (Metric 11)___

___ Number needing **In-depth** Choose an item. List frequency of inspection. (Metric 11)____

___ Number of **Special insp** Choose an item. List frequency of inspection. (Metric 11)

**9. Does your inspection team believe it has enough time to do the job?**

Yes ☒ No ☐

**10. List your quality assurance checks made during the inspection process?** (Metric 20)

**?, not sure what you are looking for here** I am looking for items like taking existing plans out in the field, previous inspection reports and photos. Double checking measurements like GR height GPS coordinates General Geometrics to make sure what is in Assetwise matches what is in the field. Below is what other counties have included.

*"Inspections are generally performed by a two-man team, using an iPad with Cellular connection, logged into Assetwise while onsite. Accordingly, the previous year's inspection report(s) and photos can be viewed as the current inspection is being conducted. Any changes to ratings are verbally discussed by both team members, confirmed, and noted on-site in the new Assetwise inspection using the iPad at the bridge site. Bridge Program Manager reviews all inspections, including defect photos, and verifies changes from previous year in Assetwise. Built-in error checking in Assetwise is also reviewed. "*

**11. Do you have any bridges that need underwater inspections in less than 60-month intervals?** (Metric 8)

Yes ☐ No ☒ (Assetwise check)

**12. Do any bridges have fracture critical inspections performed more frequently than 24-month intervals?** (Metric 10)

Yes ☒ No ☐ (Assetwise check)

**13. Is a Team Leader at the bridge at all times during the following inspections?** (Metric 12)

Initial Inspection? Yes ☒ No ☐

Routine Annual Inspections? Yes ☒ No ☐

Special Inspections? Yes ☒ No ☐

Underwater Inspections? Yes ☐ No ☒

Fracture Critical Inspections? Yes ☒ No ☐

## E. INSPECTION PROCEDURES

**1. Approximately how many inspections were made during last calendar year?** (Metric 6)

**265**

**2. Approximately how many inspections are scheduled for the current calendar year?** (Metric 6)

**265**

**3. Average number of inspections per day** (Metric 6) **10**

**4. Approximately how long (hours) does it take to inspect average sized structures**

a. Beam/Girder: Simple Span: ___0.5___hrs. Multi-span: ___1__hrs.

b. Slab bridge: Simple Span: ___0.5___hrs. Multi-span: __1___hrs.

c. Truss (pony): Simple Span: ___1___hrs. Multi-span: __N/A___hrs.

d. Through/deck): Simple Span: ___0.5___hrs. Multi-span: __1___hrs.

e. Culvert: Single cell ___0.25____hrs Multiple Cells: __0.50__hrs.

**5. Are previous inspection reports available at site for review?** (Metric 15) Yes ☒ No ☐

**6. Are bridge inspections recorded in field on** ☒ Paper ☐ Electronically

**7. Are photos available for every bridge?** Yes ☒ No ☐ **(If no, you need to start.)**

**8. Are photos posted in Assetwise?** Yes ☒ No ☒ **(If no, you need to start, and be selective.)**

**9. Are defects photos taken during inspection?** Yes ☒ No ☐ **(If no, you need to start.)**

**10. Are Bridge comments recorded in Assetwise?** Yes ☒ No ☐ **(If no, you need to start.)**

**11. Are previous bridge comments brought to the bridge?** Yes ☒ No ☐ **(If no, why not)**

**12. Are the bridge plans carried to the bridge site for review? (Metric 15).** Yes ☐ No ☒

**13. Are bridge records available for review in the bridge office? (Metric 15)** Yes ☒ No ☐

**F. SCOUR CRITICAL BRIDGES (Guidance in ODOT Manual of Bridge Inspection)**

**1. No. of bridges considered scour susceptible? (Service over Water) Number 265**

**2. Number of bridges inspected by probing? Number 265.**

**3. Number of Scour Critical bridges (item 113 - 3, 2, 1 or 0)? (Metric 18) Number _0__.**

**4. Are Plans of Action (POA) complete and implemented for all bridges coded "Scour Critical"? (Metric 18) Yes ☒ No ☐ If no, Why?** Click or tap here to enter text.

**5. How many structures are coded 6 on item 113 Scour Critical? (Metric 18) Number ___0___.**

6. **How are scour evaluations performed? (Metric 18)**

**Visual, probing, measuring, review plans**

**7. Who determines the need for diving inspections and by what criteria?**

**County Engineer, if it can not be routinely checked during low water times**

## G. INVENTORY

**1. What kinds of inventory quality assurance checks are performed?** (Metric 22)

Who checks? **County Engineer, CEAO:Mark Sherman, ODOT, FHWA**

How Often?... ☒ With every inspection ☐ Less often than once per year

**2. How often is the inventory checked for needed updates?** (Metric 22)

How Often?... ☒ With every inspection ☐ Less often than once per year

**3. How is the inventory data input into Assetwise?**

☐ Electronically, Direct into Assetwise from collector App. as bridge is inspected
☒ All at once at the end of the year from a paper copy into Assetwise
☐ As each inspection is complete from paper to computer to Assetwise.

**4. When is the updated/new inventory data forwarded to ODOT?** (Metric 23)

Changes discovered during inspection? Yes ☒ No ☐
Changes from new construction or rehab? Yes ☒ No ☐

**5. NBIS requires that the inspecting organization maintain master lists of the following**: (Metric 16,17,11)

a. Bridges that contain fracture critical members, including the location and description of such members on the bridge and the inspection procedures of such members (Each individual FCM member on each FCM bridge must be clearly identified in the bridge file) (Where a FCM Identification Plan exists then look for remaining fatigue life). Master List?

Yes ☒ Number__3___: If, No, Why not? _____ NA ☐

b. Bridges requiring underwater inspections.
Number_____ NA ☒

c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension)
Number__2___ NA ☐

**Note: An examination of the files will be performed during the review.**
Options: For the files listed below you can email a copy of a typical file or have them on hand for inspection.

- Bridge Files
- Scour Critical POA.
- Fracture Critical Plan.
- UW inspection Procedure

## H. PROCEDURES

**1. Are new maintenance problems identified during bridge inspection? (Metric 15)**

Yes ☒ No ☐

**2. How do the inspectors inform maintenance personnel of routine bridge maintenance problems ( written, oral, other)? (Metric 15)**

☒ Written work order.
☒ Electronic Communication.
☒ Oral direction.
☐ Other. Explain Click or tap here to enter text.

**3. Who do the inspectors notify when emergency repairs, or critical findings are necessary (action required within 1 week)? (Metric 21)**

Check all that apply.

☒ County Engineer ☒ Bridge Superintendent
☐ County bridge Engineer ☒ Sherriff

**How is this emergency action documented? (Must be entered and tracked in Assetwise)**

Explain if different than procedure in Assetwise **Also tell Commissioners, paper file**

**4. If a bridge requires emergency repairs, is this noted as part of the inspection report or as a separate document? (Metric 21)**

**In the inspection report, on GIS bridge layer, and in the paper bridge folder**

**5. Who checks proper placement of signs (load posting, clearance, speed restriction, narrow bridge etc.)? (Metric 15)**

**Bridge Inspector, Garage Sign Maintenance Person**

## I. LOAD ANALYSIS AND POSTING

**1. Number of plans for existing bridges available for NBIS length bridges**. _~80%_

**2. Number of plans for non-NBIS bridges (>= 10' and <= 20' long)** _~80%_

***3.*** **Number of bridges analyzed using the *AASHTO Bridge Evaluation*** **(Metric 13)**____
**By Whom** **(Metric 13)**

- ☐ Load Rating Engineer
- ☒ County Engineer
- ☐ Bridge Engineer
- ☒ Consultant

**4. When are bridges load rated, after initial rating. Check all that apply**

- ☐ Every 5 years regardless.
- ☒ When there is a significant change in condition rating.
- ☐ When wearing surface thickness increases more than 1-1/2 inches
- ☒ When permit load is requested
- ☐ other

**5. Methods used** **(Metric 13)**

- ☒ AASHTO BrR
- ☐ Hand Calculated
- ☒ Engineering Judgement (BR100)
- ☒ BARS or other proprietary software program
- ☐ Other Explain_____

**6. Number of NBIS length bridges "not ratable" at all due to lack of data and may have to be field tested.** **(Metric 13)** **(***These are bridges that have a coding of* ***5****, not* ***0*** *in the method of analysis Item.)*

**Number** __0___ Plan of action for load rating these? Click or tap here to enter text.

**7. Number of NBIS length bridges load posted** **(Metric 14)** **(Assetwise Check)**

Number of bridges posted __36__. Number of bridges with posted Signs in the field__36___.

**8. List bridges closed due to condition rating (rough check) 0**

**9. List bridges rated less than 100% Ohio legal load and not physically load posted, and resolution. (Assetwise Check)**
**0**

**10. Number of NBIS bridges with Gusset Plates** (Metric 13) __1____

**11. Number of NBIS bridges with Gusset Plates analyzed.** (Metric 13) __1__

**12. Describe filing system (where files are kept):** (Metric 15)

- Inspection reports, including old inspections:

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☒ All three
☐ Other

- Design Calculations:

☒ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Plans:

☒ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Load analysis calculations:

☒ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Inventory forms:

☒ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Photos and sketches:

☐ On paper file in Office
☒ Electronically
☒ In Assetwise
☐ All three
☐ Other

- Repairs and maintenance history

☒ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Scour evaluation:

☐ On paper file in Office
☒ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Scour POA: N/A

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Fracture Critical File:

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☒ All three
☐ Other

- Load Posting/Closing:

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☒ All three
☐ Other

- Underwater inspections: N/A

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Special inspection eqpt. or procedures: N/A

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☐ All three
☐ Other

- Flood data, waterway adequacy, channel cross sections:

☐ On paper file in Office
☐ Electronically
☐ In Assetwise
☒ All three
☐ Other

**Note the NBIS Retention period**: BR-86 report 10 years, All records 3 years after bridge removed, Load rating calculations 3 years after a new rating is done.

**13. What is the FC bridge inspection frequency?** (Metric 16) **Every 12 Months**

**14. Is the FC Plan completed for all FC bridges?** (Metric 16) **Yes ☒ No ☐**

**15. Are the FCM Identified in the FC Plan?** (Metric 16) **Yes ☒ No ☐**

**16. What is the underwater inspection frequency?** (Metric 17) ___Every N/A Months_____

**17. Are the underwater elements identified and located?** (Metric 17) Yes ☐ No ☒

**18. List any complex bridges:** (Metric 19)
N/A

**19. Do the complex bridges require specialized inspection procedures and additional inspector training?** (Metric 19)
Yes ☐ No ☒

Describe:

Other equipment not listed above: Click or tap here to enter text.

# Part II: Field Review

**Inspection Reports** (metric 12)

As part of this review, seven bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all of the field sampled bridges properly reflected the field conditions within the tolerance of 1 rating value when compared to the Manual.
Summary ratings correspond with the NBIS inspection items.

**Field Review:**

PUT-C0007-00.614_(6933521) Prestressed Concrete Box (Cont.)

Item 58 Deck……..5 Agreed
Item 59 Superstructure…… 5 Agreed (joints leaking , as are voided areas, with efflorescence.)
Item 60 Substructure……..6 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……5 Agreed
Item 62 Culvert…….. N
Item 67.01 GA ……5 Agreed
Item 36 Railing…….. 0 N ~~0~~ N ~~0~~ N No railing off bridge
Item 72 Approach Alignment ……..8 Agreed
Comments: Great comments in Assetwise!
Defect Photos: Good photos in Assetwise, but they need labeled so you know which abutment, beam, etc. you are looking at.
Channel Photos: Good Channel Photos

PUT-C011J-00.044_(6930158) Steel Beam Multi

Item 58 Deck……..6 Agreed

Item 59 Superstructure……..4 Agreed (beams were retrofitted).
Item 60 Substructure……..5 Agreed (extensive cracking on one abutment, but sounded solid for now.)
Item 61 Channel……6 Agreed
Item 61.01 Scour……..7 Agreed
Item 62 Culvert……..N
Item 67.01 GA ……..4 Agreed
Item 36 Railing …….. 0 0 0 0 Agreed
Item 72 Approach Alignment ……..6 ( I might have gone a little higher on the approach alignment.)
Comments: Great Comments in Assetwise
Defect Photos: Good defect photos, but they need labeled. Plus it would be better to have a couple of wider angled shots to put the defects into scale and context.
Channel Photos: One really good photo. The others do not capture the other side looking back at the bridge and observing both abutments relative to the channel.

## PUT-C000D-07.210 _(6930212) Pipe Culvert (Corr. metal plate)

Item 58 Deck……..N Agreed
Item 59 Superstructure……N Agreed
Item 60 Substructure……..N Agreed
Item 61 Channel……7 Agreed
Item 61.01 Scour……7 Agreed
Item 62 Culvert…….. 5 Agreed
Item 67.01 GA ……..5 Agreed
Item 36 Railing…… N N N N Agreed
Item 72 Approach Alignment …….. 6 I would go higher. The road is straight and flat and you don't even know there is a structure there. The utility pole does not count.

Comments: Ok comments in Assetwise! Need to state location extent and severity
Defect Photos: Good defect photos….labels needed
Channel Photos: Very good channel photos.

PUT-T018A-00.346_(6931928)  Steel truss  pony

Item 58 Deck…… 7  Agreed

Item 59 Superstructure…… 6  The lower cord in in compression and is deformed (bowed) at the ends.  Bearings are frozen and half buried.  For this reason, I would rate the super a 5.
While there is no section loss, it is not performing as designed

Item 60 Substructure……5  Agreed

Item 61 Channel……..6  Agreed

Item 61.01 Scour……7  Agreed

Item 62 Culvert……N  Agreed

Item 67.01 GA ……5  Agreed

Item 36 Railing…….. 0  0  0  0  Agreed

Item 72 Approach Alignment …..2  A rating of 2 is very harsh and would be rated such with zero visibility and a cause for action to be taken.  A change in roadway width and material does cause motorist to slow down, as dose the 10 Ton limit sign, so at best this is a 4 or 5.



I don't like the numerical examples in the manual, but I do like the discussion/explanation. See below.

## NBI #72 – Approach Roadway Alignment

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those bridges which do not function properly or adequately due to the alignment of the approaches. It is not intended that the approach roadway alignment be compared to current standards but rather to the existing highway alignment. This concept differs from other appraisal evaluations. The establishment of set criteria to be used at all bridge sites is not appropriate for this item. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

The individual structure shall be rated in accordance with the general appraisal rating guide described on page 453 in lieu of specific design values. The approach roadway alignment will be rated intolerable (a code of 3 or less) only if the horizontal or vertical curvature requires a substantial reduction in the vehicle operating speed from that on the highway section. A very minor speed reduction will be rated a 6, and when a speed reduction is not required, the appraisal code will be an 8. Additional codes may be selected between these general values.

For example, if the highway section requires a substantial speed reduction due to vertical or horizontal alignment, and the roadway approach to the bridge requires only a very minor additional speed reduction at the bridge, the appropriate code would be a 6. This concept shall be used at each bridge site.

Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.

*Record the appropriate code from the table below about the condition of the approach alignment.*

*For example, if the highway section requires substantial speed reduction due to vertical or horizontal alignment, and roadway approach to the bridge requires only a very minor additional speed reduction at the bridge, the appropriate code would be 6. This concept shall be used at each bridge site.*

*Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.*





| Code | Description |
|---|---|
| N | Not Applicable (for only Non-highway bridges) |
| 9 | Superior to present desirable criteria |
| 8 | Equal to present desirable criteria |
| 7 | Better than present minimum criteria |
| 6 | Equal to present minimum criteria |
| 5 | Somewhat better than minimum adequacy to tolerate being left in place as is |
| 4 | Meets minimum tolerable limits to be left in place as is |
| 3 | Basically intolerable requiring high priority of corrective action |
| 2 | Basically intolerable requiring high priority of replacement |
| 0 | Bridge Closed |

## NBI #73 and NBI #74 - Reserved

*Do not use.*

This approach would be a 4 at best, a 3 at worst.

Comments: Very good comments. May want to start quantifying problem areas. Extent and severity as an example.
Defect Photos: Good defect photos, but could use some labeling as mentioned earlier.
Channel Photos: Great Channel photos

PUT-T0019-19.022_(6930301) Concrete slab

Item 58 Deck……..5 Agreed
Item 59 Superstructure…… 5 Agreed
Item 60 Substructure…….5 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……..6 Agreed
Item 62 Culvert…… N Agreed
Item 67.01 GA ……..5 Agreed
Item 36 Railing…… 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 6 A little low in my opinion as it is flat and straight. You can't count the guardrail width as an alignment concern. See commentary above.
Comments: Great comments in Assetwise
Defect Photos: Good photos
Channel Photos: Very good channel photos.

PUT-C000B-05.248_(6930336) Steel beams

Item 58 Deck……6 Agreed
Item 59 Superstructure…… 5 Agreed
Item 60 Substructure…….6 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……..7 Agreed
Item 62 Culvert……N
Item 67.01 GA ……..5 Agreed
Item 36 Railing…….. 0 N 0 0 No railing off bridge so they ends and approach rails are Ns
Item 72 Approach Alignment ….6 Agreed
Comments: Great comments in Assetwise.
Defect Photos: Good defect photos…again, need some labeling and contextual shots too.
Channel Photos: Acceptable. Could improve the tree obstructed view by taking closer multiple shots to get it all in.

(This bridge is posted for 70% legal, but there are no signs in the field indicating such posting.)

PUT-T000A-03.740_(6931278) Steel Beams

Item 58 Deck……6 Agreed
Item 59 Superstructure…… 7 Agreed Water too deep to wade under beams.
Item 60 Substructure……4 Agreed
Item 61 Channel…….. 6 Agreed
Item 61.01 Scour……7 Agreed
Item 62 Culvert…… N Agreed
Item 67.01 GA …….. 4 Agreed
Item 36 Railing…….. 0 N 0 0 Agreed

Item 72 Approach Alignment …6 Agreed
Comments: Great comments in Assetwise.
Defect Photos: Good defect photos…again, need some labeling and contextual shots too.
Channel Photos: Good channel shots

**Field Review Summary:**

Overall, the county is doing an excellent job with their bridge inspection program. Their records are complete and organized. I found all of their condition ratings to be within the parameters set by the inspection manual. The comments could use a little more elaboration at times, with corresponding photos to show the Location, Extent and Severity of the defects. Otherwise, the comments and photos are good.

## PART III Office file Review

Fracture critical bridges. 1

Fracture Critical Member and Fatigue Prone Connection ID Plan. 1

Bridge Load Rating Report, including Gusset plate analysis. 1

Underwater inspections 0

POA for Scour All scour repairs undertaken as they are discovered, eliminating the need for a POA.

Scour susceptible bridges Everything over a stream with shallow foundations

Critical findings 0

All reviewed files are complete with all documentation concerning load rating, channel photos and defect photos, along with previous inspection reports. Their files are complete and comprehensive, documenting the bridge history through reports, plans and photographs.

## PART IV Snapshot DATA Summary of Program

**PUTNAM County 2022**

**INVENTORY, APPRAISAL & INSPECTION SNAPSHOT**

11/7/2022

**Inventory Data - NBIS Bridges Only**

| | NBIS COUNT |
|---|---|
| NBIS Bridges > 20' | 162 |
| Bridges 10'-20' | 103 |
| All Bridges | 265 |

| Item 221 | Inspection Responsibility | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab Col BV,BW | County | 2 | 162 | 265 |

| Item 21 | Maintenance responsibility | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab | County | 2 | 162 | 264 |
| Col D | City or other local | 4 | 0 | 0 |
| | Railroad | 27 | 0 | 0 |
| | Private (tohter than RR) | 26 | 0 | 1 |
| | State Park | 11 | 0 | 0 |
| | Local Park | 23 | 0 | 0 |
| | State Agency | 1 | 0 | 0 |
| | Township | 3 | 0 | 0 |
| | | | 162 | 265 |

| Item 42A | Type service on bridge | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab | Other | 0 | 0 | 0 |
| Col Q | Highway | 1 | 160 | 263 |
| | Railroad | 2 | 0 | 0 |
| | Ped/Bikeway | 3 | 1 | 1 |
| | Hwy/RR | 4 | 0 | 0 |
| | Hwy/Ped | 5 | 1 | 1 |
| | | | 162 | 265 |

| Item 42B | Type service under bridge | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab | Other | 0 | 0 | 0 |
| Col R | Hwy w/ or w/o Ped | 1 | 0 | 0 |
| | Railroad | 2 | 0 | 0 |
| | Ped/Bkwy | 3 | 0 | 1 |
| | Hwy w/ RR | 4 | 0 | 0 |
| | Waterway | 5 | 162 | 264 |
| | Hwy/Waterway | 6 | 0 | 0 |
| | RR/Waterway | 7 | 0 | 0 |
| | Hwy/Waterway/RR | 8 | 0 | 0 |
| | Relief (for waterways) | 9 | 0 | 0 |
| | | | 162 | 265 |

All data is complete and correct in this section.

| ITEMS 43A,B,C Structure Type | Data (Col M,N,O) | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Concrete Slab | | 101 | 1 | 16 |
| Concrete Frame | | 107 | 7 | 38 |
| Concrete Culvert (incl frame culverts) | | 119 | 0 | 15 |
| Concrete Continuous Slab | | 201 | 1 | 1 |
| Steel Beam or Girder | | 302 | 60 | 78 |
| Steel Thru Truss (inlcudes Pony) | | 310 | 4 | 4 |
| Steel Culvert (incl frame culverts) | | 319 | 1 | 7 |
| Steel Continuous Beam or Girder | | 402 | 6 | 6 |
| Prestressed Concrete Thru Arch | | 502 | 1 | 1 |
| Prestr. Conc. Cont. Box Beam/Girder Multiple | | 505 | 80 | 98 |
| Prestr. Conc. Cont. Box Beam/Girder Multiple | | 605 | 1 | 1 |
| | | | **162** | 265 |

| Item 92A Fracture Critical | | CODE | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab | Requires FC Inspection | Y | **3** | n/a |
| Col U,V,Y | Requires FC Inspection | N | **159** | n/a |
| | | | **162** | n/a |
| | | | | |
| | FC Switch Y/N is Blank | | 0 | n/a |

| Item 113 Scour | | | #NBIS | #ALL |
|---|---|---|---|---|
| Data Tab | Bridge not over waterway | N | **0** | 1 |
| Col AA | unknown foundation | U | **0** | 0 |
| | over tidal waters | T | **0** | 0 |
| | foundations on dry land | 9 | **0** | 1 |
| | stable above footing | 8 | **128** | 205 |
| | countermeasures installed | 7 | **5** | 7 |
| | no scour evaluation made | 6 | **0** | 0 |
| | stable within footer limits | 5 | **17** | 24 |
| | stable action needed | 4 | **12** | 27 |
| | scour critical - unstable | 3 | **0** | 0 |
| | scour critical - scour present | 2 | **0** | 0 |
| | scour critical - failure imminen | 1 | **0** | 0 |
| | scour critical - bridge failed | 0 | **0** | 0 |
| | | | **162** | 265 |

All data is complete and correct in this section.

| Item 63 | Documented Engineering Judgment | | | # NBIS | # ALL |
|---|---|---|---|---|---|
| | | Field Eval & Doc EJ | | 1 | n/a |
| | | | BR_100 for these bridges? | | |

| Item 92B | Underwater | CODE | # NBIS | # ALL |
|---|---|---|---|---|
| Data Tab | requires dive inspection | N | 162 | n/a |
| Col W,X,Z | requires dive inspection | Y | 0 | n/a |
| | | | 162 | |

| Item 709 | Plan Information | CODE | # NBIS | # ALL |
|---|---|---|---|---|
| Data Tab | plans not avail | 0 | 2 | 2 |
| Col. AW | plan avail | 1 | 100 | 194 |
| | field measured | 2 | 58 | 66 |
| | Field Testing | 3 | 0 | 0 |
| | not applicable | N | 1 | 1 |
| | | | 161 | 263 |

| Item 63 | Method of Analysis | CODE | # NBIS | # ALL |
|---|---|---|---|---|
| Data Tab | Field Eval & Doc. Engr Judgmen | 0 | 1 | 1 |
| Col. AV | Work Stress | 1 | 0 | 0 |
| | LFR | 2 | 0 | 0 |
| | LRFR | 3 | 0 | 0 |
| | load test | 4 | 0 | 0 |
| | No rating done | 5 | 0 | 26 |
| | LFR | 6 | 139 | 179 |
| | AS | 7 | 6 | 36 |
| | LRFR | 8 | 16 | 22 |
| | Assigned LFR HS20 | D | 0 | 0 |
| | Assigned LRFR HL93 | F | 0 | 1 |
| | not appl (RR, etc) | X | 0 | 0 |
| | | | 162 | 265 |

**REMINDER:**

**Load Factor required for bridges built after 1993** **(exceptions: timber, etc,)**

**LRFR required for bridges built after 2010**

PUT-T0U20-23.48_(6930914) Data TAB Column AW Look for Yellow highlight

*Given the changes coming in 2023 and the now required shear analysis, please make sure your load rating documentations are complete and include a BR100 with complete statements of assumptions, measurements and methodologies for anything using engineering judgement.*

All data is complete and correct in this section.

## Inspection Condition Data - NBIS Bridges Only

| Item 41 | Operating Status | | CODE | #NBIS | #ALL |
|---|---|---|---|---|---|
| Data Tab | | Open, No restriction | A | 113 | 211 |
| Col AM | | Open, posting recommended | B | 0 | 0 |
| | | Open, Half width constr. | C | 0 | 0 |
| | | Open because of temp. fix | D | 0 | 0 |
| | | Open using temp. structure | E | 0 | 0 |
| | | New struture not yet open | G | 0 | 0 |
| | | closed for load cap. reason | K | 1 | 1 |
| | | Posted for load capacity | P | 48 | 53 |
| | | Posted for other than load | R | 0 | 0 |
| | | Closed for other than load | X | 0 | 0 |
| | | | | 162 | 265 |

| Metric 13 | Load Rating Data | |
|---|---|---|
| Load Rating Tab | | # OF ERRORS |
| Col. AN | Op RF greater than Inv RF? | 0 |
| Col. AO | Posting and % Legal OK? | 0 |
| Col. AP | "0" used instead of blank | 0 |
| Col. AT | % legal <> lowest RF | 0 |
| Col.A V | Item 70 correct? | 0 |
| Col. AW | Method of Rating Alike? | 0 |
| Col. AX | Op & Inv RF in Tons as req'd? | 1 |
| Col. AY | Item 575 correct? | 0 |
| Col. AZ | Depth of fill completed? | 0 |

PUT-T0019-19.022_(6930301)
Operating and Inventory Rating needs to be in TONS for Rating method cited.

All data is complete and correct in this section.

# KEY METRICS

| | | | |
|---|---|---|---|
| (C) | Compliant | (CC) | Conditionally Compliant |
| (SC) | Substantially Compliant | (NC) | Non- Compliant |
| | | (NC) | (SC) If corrected within 6/12 months |
| | | | Refresher=6 mo, Comprehensive=12 mo |

**METRIC 2 - Program Manager Qualificatio** (from files examination)

| From Files review | Missing | #sampled | % PASS | COMPLIANCE |
|---|---|---|---|---|
| PE /Experience | 0 | 1 | 100.0% | (C) |
| Comprehensive | 0 | 1 | 100.0% | (C) |
| Refresher | 0 | 1 | 100.0% | (C) |

**METRIC 3 - Team Leader Qualification** (from files examination)

| From Files review | Missing | #sampled | % PASS | COMPLIANCE |
|---|---|---|---|---|
| Degree /Experience | 0 | 3 | 100.0% | (C) |
| Comprehensive | 0 | 3 | 100.0% | (C) |
| Refresher | 0 | 3 | 100.0% | (C) |

**METRIC 6 Insp. Frequency Routine**

| Bridge Inspections Overdue | | | # OVERDUE | | % PASS | COMPLIANCE |
|---|---|---|---|---|---|---|
| Data Tab | NBIS - | 24 months | 0 | | 100.0% | (C) |
| Col. AB | ORC - | Calendar Year | 0 | | 100.0% | (C) |
| Col. AB | All | Routine insp. | 0 | | | |
| | BIM - | 18 months | 0 | | 100.0% | (C) |

**METRIC 8 - Insp. Frequency Underwater**

| Dive Inspections Overdue | | # OVERDUE | # UW | % PASS | COMPLIANCE |
|---|---|---|---|---|---|
| Data Tab Col. Z | 60 months | 0 | 0 | 100.0% | (C) |

**METRIC 10 - Insp. Frequency FC Member**

| FC Inspections Overdue | | # OVERDUE | # FC | % PASS | COMPLIANCE |
|---|---|---|---|---|---|
| Data Tab Col. Y | 24 months | 0 | 3 | 100.0% | (C) |

All other bridge data is complete and correct in this section.

| METRIC 8 - Insp. Frequency Underwater | | | | | | |
|---|---|---|---|---|---|---|
| Dive Inspections Overdue | | # OVERDUE | # UW | % PASS | | COMPLIANCE |
| Data Tab Col. Z | 60 months | 0 | 0 | 100.0% | | (C) |
| | | | | | | |
| METRIC 10 - Insp. Frequency FC Member | | | | | | |
| FC Inspections Overdue | | # OVERDUE | # FC | % PASS | | COMPLIANCE |
| Data Tab Col. Y | 24 months | 0 | 3 | 100.0% | | (C) |
| | | | | | | |
| METRIC 12 - Routine Inspection | | (** from field review) | | | | |
| Field Ratings | | # > +/-1 | # Ratings | % PASS | | COMPLIANCE |
| | field ratings** | 0 | 24 | 100.0% | | (C) |
| Comments | | Missing | # < 6 | % PASS | | |
| Tab | Comments when Rating < 6 | 0 | 161 | 100.0% | | (C) |
| | Adequacy comments ** | 0 | 30 | 100.0% | | (C) |
| | | Error | Total Scour | % PASS | | |
| Comment | Rating should be = Scour | 2 | 159 | 98.7% | within tolerance +/- 1 | |
| Tab | Noncompliant Scour Rating Err | 1 | 159 | 99.4% | | (C) |

See Comments TAB
PUT-C000P-09.478_(6934021) PUT-C000M-19.535 _(6930204)
Scour controls substructure rating
PUT-C000P-09.478_(6934021) Scour is 2 or more points below general appraisal.
All data is complete and correct in this section.

| METRIC 14 - Posting | Load rating data tab | | | |
|---|---|---|---|---|
| From Files review | # errors | #sampled | % PASS | COMPLIANCE |
| Op RF < 3 tons but not closed | 1 | 162 | 99.4% | (SC) |
| Op RF = 0 but not closed | 0 | 162 | 100.0% | (C) |
| % Legal < 100 but not posted | 0 | 162 | 100.0% | (C) |
| Item 41 = B | 0 | 162 | 100.0% | (C) |

PUT-T0019-19.022_(6930301) Method of load rating requires Operating and inventory rating be in Tons.
All other bridge data is complete and correct in this section.

| METRIC 16 - Fracture Critical Inspection | (from files examination) | | | |
|---|---|---|---|---|
| From Files review | Missing | # FC | % PASS | COMPLIANCE |
| Fract Critical Member ID | 0 | 2 | 100.0% | (C) |
| Fatigue Prone Detail | 0 | 2 | 100.0% | (C) |
| Gusset Plate Calculations | 0 | 2 | 100.0% | (C) |
| FC Inspection Procedure | 0 | 2 | 100.0% | (C) |
| | | | | |
| METRIC 17 - Underwater Inspection | (from files examination) | | | |
| From Files review | Missing | # UW | % PASS | COMPLIANCE |
| UW Inspection Procedure | 0 | 1 | 100.0% | (C) |
| Location of UW elements | 0 | 1 | 100.0% | (C) |
| UW frequency identified | 0 | 1 | 100.0% | (C) |

All data is complete and correct in this section.

## PRELIMINARY FHWA 23 Metric Matrix

23 metrics used by FHWA to measure NBIS compliance

**Compliance Codes for the following Metrics:**

| | |
|---|---|
| **(C)** | Compliant |
| **(SC)** | Substantially Compliant |
| **(CC)** | Conditionally Compliant (Adhering to approved PCA) |
| **(NC)** | Not Compliant |

| Metric | Description | (C) | (SC) | (CC) | (NC) |
|---|---|---|---|---|---|
| 1 | State Bridge Inspection Organization | | | | |
| 2 | Program Manager Qualification | | | | |
| 3 | Team Leader Qualification | | | | |
| 4 | Load Rating Engineer Qualification | | | | |
| 5 | UW Bridge Inspection Diver Qualification | | | | |
| 6 | Routine Inspection Frequency - Low Risk | | | | |
| 7 | Routine Inspection Frequency - High Risk | | | | |
| 8 | UW Inspection Frequency - Low Risk | | | | |
| 9 | UW Inspection Frequency - High Risk | | | | |
| 10 | FC Inspection Frequency | | | | |
| 11 | Frequency Criteria | | | | |
| 12 | Inspection Quality ** | | | | |
| 13 | Load Rating | | | | |
| 14 | Posted or Restricted Bridges | | | | |
| 15 | Bridge Files | | | | |
| 16 | FC Bridges | | | | |
| 17 | UW inspection procedures | | | | |
| 18 | Scour Critical Bridges | | | | |
| 19 | Complex Bridges | | | | |
| 20 | QC/QA | | | | |
| 21 | Critical Findings | | | | |
| 22 | Inventory ** | | | | |
| 23 | Updating of Data | | | | |

** based on results of Field Review

| Metric | Action Needed |
|---|---|
| 14 | Data Cleanup for bridge cited |
| | |