National Bridge Inspection Standards &
Bridge Maintenance Program Review
Greene County
April 13, 2021

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

IN ATTENDANCE:

Stephanie Goff, Greene County
Craig Gillespie, Greene County
Mark Stockman, CEAO Federal Bridge QA/QC Engineer
Mark Sherman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Greene County personnel, reviews of inspection and inventory data, and reviews of Greene County bridge records. The office evaluation assessed Greene County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of six bridges were conducted to determine if ratings were consistent with the ODOT Coding Manual and FHWA Recording and Coding Guide and to determine if inventory items were coded correctly. Action Items are highlighted in yellow. The bridges were selected by the QAR engineer to represent a variety of structure types and conditions. The bridges checked during the field review were:

Asset Name	TYPE	County Rating	Suggested NBIS Rating
GRE-C0011-0083 _(2934574)	Prestr Conc Box Beam	5A	4A
GRE-C0044-0070 _(2930390)	Steel Beam	6A	same
GRE-C0135-0347 _(2935015)	Masonry Arch	5A	same
GRE-C0096-0104 _(2939096)	Conc. Frame	6A	5A
GRE-T0165-0065 _(2938693)	Prestr Conc Box Beam	6A	same
GRE-C0027-0197 _(2935708)	Steel Culvert	5A	same

FINDINGS AND COMMENTS:

General

Ohio State statutes establish requirements governing the safety inspection of all bridges within the State borders. ODOT with participation of FHWA has developed the ODOT publication Bridge Inspection Manual, hereafter referred to as the Manual, which establishes guidance and requirements regarding bridge inspections within the State. FHWA has determined that ODOT guidance meets or exceeds the FHWA NBIS requirements.

The federal regulations for administering the NBIS are located in the Code of Federal Regulations 23 Highways – Part 650 Subpart C - National Bridge Inspection Standards. The regulations can be found at the following web site:
http://wwwcf.fhwa.dot.gov/legsregs/directives/fapg/cfr0650c.htm

Ohio currently rates bridge element conditions with a 1-4 scale. Summary items conform to the definitions and rating scales established by the NBIS. The NBIS do not require element level condition rating for County bridges unless they are on the expanded National Highway System (NHS) beginning October 1, 2014.

Greene County has inspection responsibilities for 283 bridges, 162 of which are longer than 20 feet in length and 121 which are 10 feet to 20 feet long. The NBIS inspection and load rating requirements only pertain to highway bridges in excess of 20' long on public roads. Review of the inventory span lengths showed that all bridges had the NBIS designation Y/N coded correctly.

The office review and the field review demonstrated that County personnel were inspecting and coding bridges in accordance with ODOT's Bridge Inspection Manual ("Manual").

Inspection Procedures

Greene County uses their own staff to do the Routine inspections. The previous year's inspection reports are brought out on paper and changes are made on that form and transferred to AssetWise in the office. Bridge comments are recorded in the inspection form and transferred to AssetWise. Bridge plans are available in the office and at the bridge. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection.

The County indicated that an average of 6 inspections per day were completed in 2020. It takes about 4 hours for Truss (pony/through/deck). It takes 2 hours for Beam/Girders. For a slab, it takes about 1 hour. For a Culvert, it takes about 1 hour.

The County has 0 bridges that require a snooper. 12 could possible use one but it is not done at this time.

A Team Leader is present at routine inspections.

3 bridges were missing comments where the rating was =<5

1 bridge had a scour rating 6 that should have controlled the substructure rating of 8

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Greene County had 439 bridges inspected in 2020. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. The Program Manager determines the need for a routine inspection frequency greater than once a year, based on condition, critical items, replacement schedule, and haul routes.

There are 0 bridges that require inspections more frequently than one year.

Qualification and Duties of Personnel

Ms. Stephanie Goff is the County Engineer and Program Manager. She is a PE and has 25 years of bridge inspection experience. She took ODOT Level 1 bridge training in 1996 and ODOT Level 2 training in 2012. She took a Refresher in 2018. The Refresher and Comprehensive classes are approved and uploaded to AssetWise. She is qualified to be the Program Manager.

Mr. Craig Gillespie is a Team Leader. He has 6 years of bridge inspection experience. He took ODOT Level 1 bridge training in 2015 and a NHI FC class in 2017 and an ODOT Refresher in 2021. The Refresher and Comprehensive classes are approved and uploaded to AssetWise. He is qualified to be a Team Leader.

Inspection Reports

As part of this review, six bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all six 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

GRE-C0011-0083 _(2934574)

5 - Prestressed concrete - 05 - Box Beam or Girders - Multiple - N- Not Applicable

Deck = 5

Superstructure = 5 should be a 4 based on strands (3 of 8 exposed = 38%)

Substructure = 5

Channel = 7

Scour = 7

Culvert = N

Photos = excellent sketch in cloud files.

Channel Photos = GOOD

Comments= add size of spalls and # of strands to Superstr comments – OR – state “see sketch for details” - otherwise very good. Need more LES for Substr comments

- **Item 36A**, Bridge Rail should be 0, not 1
- **Will need** a load rating review because GA dropped, put LR review results and date in load rating narrative

GRE-C0044-0070 _(2930390)

4 - Steel continuous - 02 - Stringer/Multi-beam or Girder - N- Not Applicable

Deck = 7 (should rate the wearing surface – it was coded N, but you have type of W.S coded as Monolithic)
Superstructure = 7 (Paint should be rated 9, not 7) – painted in 2016
Substructure =6
Channel = 8
Scour = 7
Culvert = N
Photos = Good
Channel Photos = need better angle for overall perspective of entire bridge in upstream view.
Downstream side use photo shown below: Consider channel X sections
Comments= Good –

Item 36 B, GR Transition should be coded 0, not 1

GRE-C0135-0347 _(2935015)

8 - Masonry - 11 - Arch - Deck - N- Not Applicable

Deck = N
Superstructure = 6
Substructure =5
Channel = 6
Scour = 7- should be 6 based on "scour along east abutment" that is mentioned in the comments
Culvert = N
Photos = OK – add photo of scour situation and or measurement, abutment photos are OK

Channel Photos = GOOD
Comments= need more LES in Substr comments describing stone and scour

GRE-C0096-0104 _(2939096)

1 - Concrete - 07 - Frame (except frame culverts) - N- Not Applicable

Deck = 8
Superstructure = 7
Substructure = 6 should be 5 at next inspection based on footer exposed total height 2/3 of footer. **Per County: This is a new development since the last inspection, but 2020 photo shows this:**

Channel = 6
Scour = 6 should be 5 based on footer exposure (2020 comment says forward footer exposed). Need measurement of exposed footer.
Culvert = N
Photos = Good
Channel Photos = Good
Comments= Need LES for Substr comments on footer exposure, total vertical side exposed 2/3 of footer.

Item 113 Scour should be code 4, not code 5

GRE-T0165-0065 _(2938693)

5 - Prestressed concrete - 05 - Box Beam or Girders - Multiple - N- Not Applicable

Deck = 6
Superstructure = 6
Substructure = 7
Channel = 8
Scour = 7
Culvert = N
Photos = Good
Channel Photos = Good
Comments= Good

GRE-C0027-0197 _(2935708)

3 - Steel - 19 - Culvert (includes frame culverts) - N- Not Applicable

Deck = ... N
Superstructure = ... N
Substructure =..... N
Channel = ... 7
Scour = ... 7
Culvert = ... 5
Photos = ... OK – photo of sag in culvert would be good
Channel Photos = ... Good
Comments= ..... LES in comments needed on sag in culvert

Inventory Items

Review of the bridge data showed 0 out of 306 bridges had no comments when the rating was <=5, and review of the 6 bridges in the field showed 3 bridges where comments were incomplete, missing sufficient detail with LES described in AssetWise when the rating was 5 or lower. This requirement became effective Nov of 2020.

2 NBIS bridges do not have the FC and UW Y/N switch completed. **Item 92A and 92B** is blank. You should complete this at the next inspection.
GRE-C0005-0020_(2939607)
GRE-T0101-0032_(2937221)

2 NBIS bridges do not have **Item 26 Functional Class** completed
GRE-C0076-0230 _(2938421)
GRE-T0047-0120 _(2935465)

1 NBIS bridge does not have the **Rating Source Item 709** completed,
GRE-T0080-01.030_(2936446)

Files

Greene County keeps files as follows: Have created system like I had at Montgomery County and still compiling construction plans, load ratings, etc Electronic files backed up with hard copy bridge files

Load Rating

The inventory shows 162 (100.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are 3 NBIS bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 2934574, 2934744, 2935708, and 2938693. The load posting at the bridge matched the load rating on all bridges. P.E. name and stamp were on all of the bridges. Documentation was on all of the bridges. BR100 form is available for all engineering judgment bridges.

There were some data errors in the load rating data:

Load Rating Data:

Item 734 % Legal errors:

GRE-C0017-00.01_(2930129) Lowest RF = 0.45, Current % Legal shown as 150, should be 45%

GRE-M0002-0039 _(2939584) Lowest RF = 3.179, Current % Legal shown as 315, should be 150%

GRE-T0047-0122 _(2935473) Lowest RF = 1.107, Current % Legal shown as 130, should be 110%

GRE-T0080-01.030_(2936446) No RF's shown, Current % Legal shown as 189, should be 150%

GRE-T0101-0032_(2937221) No RF's shown, Current % Legal shown as 210, should be 150%

Assigned Rating Error:

Assigned rating can only be used for precast concrete 3 and 4 sided boxes.

GRE-C0051-0383 _(2930463) prestressed beam

Load Posting

Greene County has 2 NBIS bridges that are load posted. There are 3 bridges closed for condition ratings. Posting is based on Operating Rating. Gross Tonnage and EV signs are the type of sign used for load posting.

Special Features

There are 0 bridges with unique or special features.

Fracture Critical Bridges

The FC bridge inspection frequency is 24 months. FC plans for SFN 2937904 were reviewed. The FCM's identified, FC Inspection Procedure and Fatigue Prone details are also included. The Fatigue Prone Detail list was not clear and needs to be improved to show the inspector where these details are. Refer to Inspection Manual Appendix D & E for a guide.

Gusset Plate calculations were satisfactory for 2931052.

The frequency of FC inspection was confusing for 2931052. In the part D. Plan of Action, It states: This method will be utilized every 12 months as required by the inspection frequency. However, in the Structure Data and Characteristics, it states: A Fracture Critical Inspection is required every 24 months.. These should be modified to be consistent.

Underwater Inspections and Scour

Greene county does not have any bridges that require dive inspections.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. The Inventory items are input by one person and checked by someone else. Inspections are checked by sampling with outside inspections by Fulton County Bridge Engineer.

Critical Findings

The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). The county engineer, or bridge engineer, or Terry Hummel, Bridge Foreman. is notified for emergency work.

Bridge Maintenance

The County does contract bridge work. The typical work is for replacement of bridges, rehab of bridges, etc. The approximate budget for both maintenance and contract work is $1.7 million. Fed Funds and Credit Bridge Funds are not used in the past but will be in the future.

The county does force account bridge work and uses highway maintenance crews of 4 with the foreman. Typical work items include waterproofing, repairs, rehabs, superstructure replacements, etc. The approximate budget for both maintenance and contract work is $1.7 million.

The chart on the following page is a review of the 23 Metrics used to measure NBIS compliance and the chart represents a **preliminary**, **tentative** assessment of the county's level of compliance. Action steps for compliance are listed at the bottom. The actual assessments of NBIS compliance are made by FHWA, based on documentation, and any final determinations of compliance may differ from this preliminary assessment. The Metric 12 & 22 result on the following page is based on the field review of the six bridges visited during the QAR using the NBIP Field Review Checklist - PY 2013, Minimum Level Review Items.

PRELIMINARY FHWA 23 Metric Matrix

23 metrics used by FHWA to measure NBIS compliance. Actual "score" by FHWA may differ.

Compliance Codes for the following Metrics:

(C)	Compliant
(SC)	Substantially Compliant
(CC)	Conditionally Compliant
(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