SNBI Sections 3 & 6 & Subsection 7.5

William (Bill) Dittrich, P.E.
Assistant State Program Manager
&
Joshua Biller, P.E.
Senior Bridge Inspection Engineer (Fort Wayne)

NextLevel INDIANA

SNBI Section 3: Bridge Geometry

Bill Dittrich & Joshua Biller

Section 3: Bridge Geometry – Overview

- Part of Primary Data Set
- One-to-one relationship with asset
- Typically static once a bridge has been inventoried

Section 3: Bridge Geometry – Items (1 of 2)

- B.G.01 – NBIS Bridge Length
- B.G.02 – Total Bridge Length
- B.G.03 – Maximum Span Length
- B.G.04 – Minimum Span Length
- B.G.05 – Bridge Width Out-to-Out
- B.G.06 – Bridge Width Curb-to-Curb
- B.G.07 – Left Curb or Sidewalk Width
- B.G.08 – Right Curb or Sidewalk Width

Section 3: Bridge Geometry – Items (2 of 2)

- B.G.09 – Approach Roadway Width
- B.G.10 – Bridge Median
- B.G.11 – Skew
- B.G.12 – Curved Bridge
- B.G.13 – Maximum Bridge Height
- B.G.14 – Sidehill Bridge
- B.G.15 – Irregular Deck Area
- B.G.16 – Calculated Deck Area

Section 3: Bridge Geometry – Crosswalk

- Data Crosswalk (https://www.fhwa.dot.gov/bridge/snbi/datacrosswalk.cfm)

Transition of Over Records

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide Format (as shown in Appendix E)	Clean Transition?	Transition Notes for Developer	Additional Notes
B.G.01	BG01	NBIS Bridge Length	N (7,1)	49	Structure Length	6/N	Partial	Convert from metric to nearest tenth of a foot when Item 49 is greater than 9.1 meters. Otherwise no value.	Bridge lengths near 20 feet must be field-measured to ensure accuracy.
B.G.02	BG02	Total Bridge Length	N (7,1)	49	Structure Length	6/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.03	BG03	Maximum Span Length	N (5,1)	48	Length of Maximum Span	5/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.04	BG04	Minimum Span Length	N (5,1)	48	Length of Maximum Span	5/N	Partial	Convert from metric to nearest tenth of a foot if Item 45 = 1 and Item 46 = 0. Otherwise, no value.	
B.G.05	BG05	Bridge Width Out-to-Out	N (4,1)	52	Deck Width, Out-to-Out	4/N	Yes	Convert from metric to nearest tenth of a foot. Null when Item 52 = 0.	TPM must continue to use Approach Roadway Width for deck area calculations.
B.G.06	BG06	Bridge Width Curb-to-Curb	N (4,1)	51	Bridge Roadway Width, Curb-to-Curb	4/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.07	BG07	Left Curb or Sidewalk Width	N (3,1)	50A	Left curb or sidewalk width	3/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.08	BG08	Right Curb or Sidewalk Width	N (3,1)	50B	Right curb or sidewalk width	3/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.09	BG09	Approach Roadway Width	N (4,1)	32	Approach Roadway Width	4/N	Yes	Convert from metric to nearest tenth of a foot.	
B.G.10	BG10	Bridge Median	AN (1)	33	Bridge Median	1/N	Yes	Direct transition.	
B.G.11	BG11	Skew	N (2,0)	34	Skew	2/N	Yes	Direct transition.	For bridges with multiple and different skew angles Coding Guide reports average and SNBI reports maximum. Agencies will need to update in accordance with FHWA implementation timeline.
B.G.12	BG12	Curved Bridge	AN (2)	N/A	N/A	N/A	No		
B.G.13	BG13	Maximum Bridge Height	N (3,0)	N/A	N/A	N/A	No		
B.G.14	BG14	Sidehill Bridge	AN (1)	N/A	N/A	N/A	No		
B.G.15	BG15	Irregular Deck Area	N (10,1)	N/A	N/A	N/A	No		
B.G.16	BG16	Calculated Deck Area	N (10,1)	N/A	N/A	N/A	Calculate	Multiply Item 49 by Item 52 when Item 52 > 0. Otherwise multiply Item 49 by Item 32. Convert from metric to nearest tenth of a square foot.	

B.G.01 – NBIS Bridge Length (1 of 3)

NBIS Bridge Length		
Format N (7,1)	Frequency I	Item ID B.G.01

Specification	Commentary
Report the NBIS bridge length to the nearest tenth of a foot measured along the roadway centerline. Measure along the roadway centerline between undercopings of abutments or spring lines of arches. For filled or closed spandrel arches, measure along the roadway centerline from inside faces of exterior spring lines. For other bridges under fill, measure along the roadway centerline from inside faces of exterior walls; this includes multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. Vaulted abutments and enclosed spans or sections are included in the NBIS bridge length. Report the field measured NBIS bridge length when Item B.G.02 *(Total Bridge Length)* is less than 30 ft.	NBIS bridge definition: A structure, including supports, erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it includes multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. (23 CFR 650.305) Structures that meet the NBIS bridge definition, and NBIS applicability in 23 CFR 650.303, are reported to FHWA. The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved structures would be measured along the curved centerline. When item B.G.02 *(Total Bridge Length)* is greater than 30.0 feet the value for this item may be estimated from plans or drawings, or estimated using the observed difference between items B.G.02 *(Total Bridge Length)* or B.G.03 *(Maximum Span Length)* and the NBIS bridge definition.

B.G.01 – NBIS Bridge Length (2 of 3)

Examples – NBIS Bridge Length

Report measurement A.

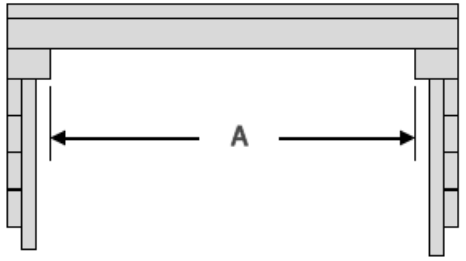


Figure 14. Profile view of a single span bridge with pile bent abutments.

Report measurement A.

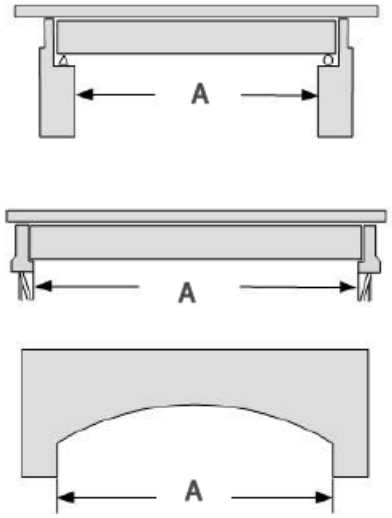


Figure 15. Profile views of various single span bridges.

Report measurement A.

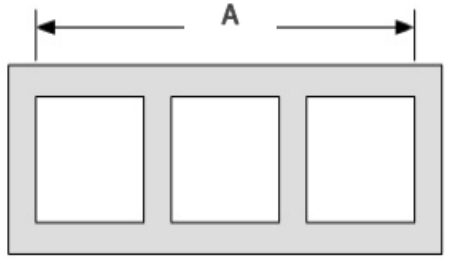


Figure 16. Profile view of a four-sided, multi-cell culvert under fill.

Report measurement A.

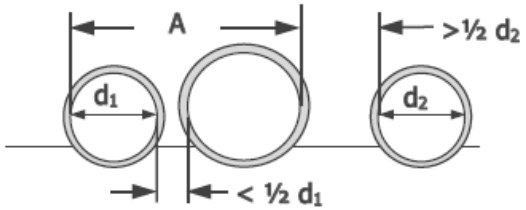


Figure 17. Profile view of a multi-pipe culvert under fill.

B.G.01 – NBIS Bridge Length (3 of 3)

Skewed multi-pipe bridge under highway has an opening of 20.85 ft measured along the center of the roadway. Report 20.9.

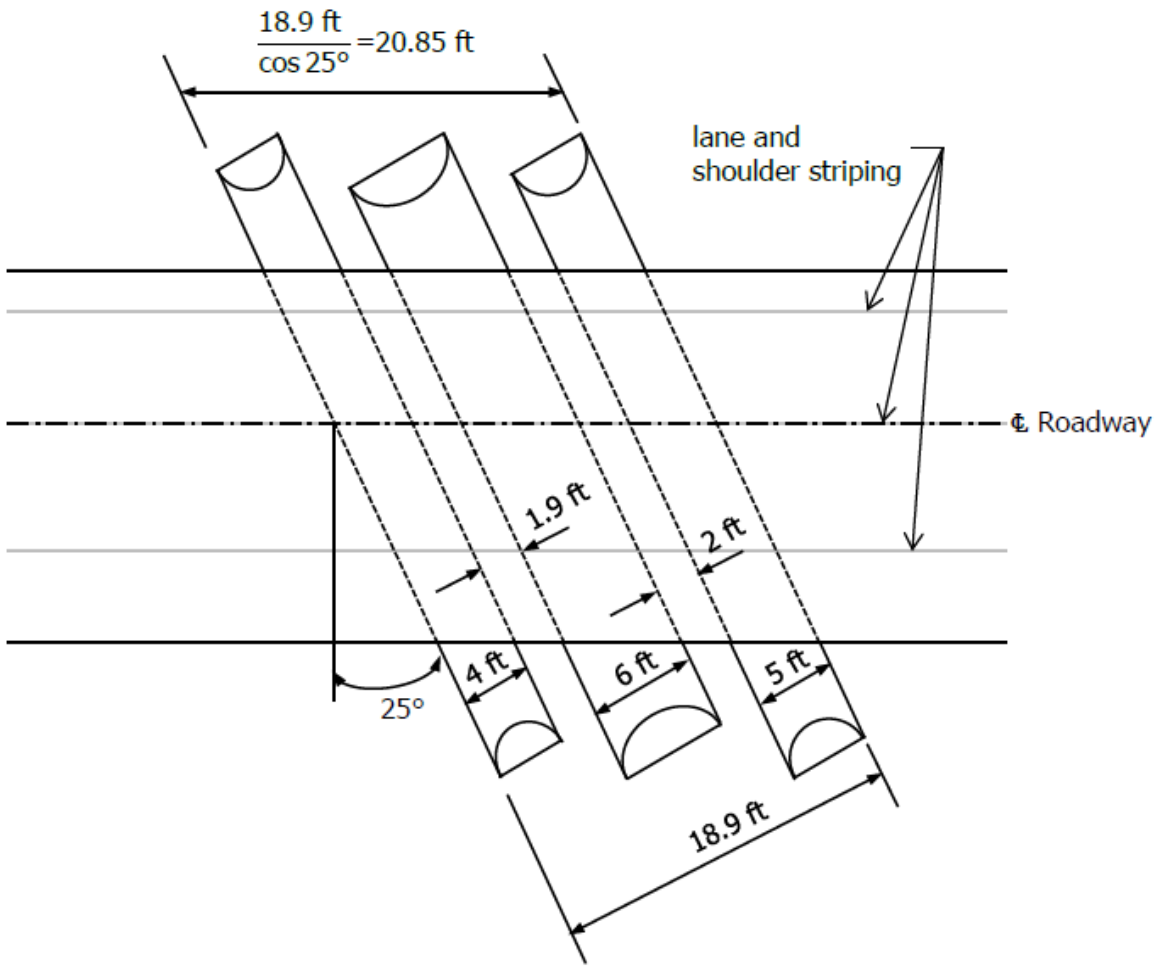


Figure 18. Plan view of a skewed, multi-pipe culvert under fill.

B.G.02 – Total Bridge Length (1 of 4)

Total Bridge Length		
Format N (7,1)	Frequency I	Item ID B.G.02

Specification	Commentary
Report the total length of the bridge to the nearest tenth of a foot measured along the roadway centerline. Measure along the roadway centerline from back-to-back of backwalls or from paving notch to paving notch at abutments. For filled or closed spandrel arches, measure along the roadway centerline from inside faces of exterior spring lines when well-defined backwalls or paving notches do not exist. For other bridges under fill, measure along the roadway centerline from inside faces of exterior walls For bridges with vaulted abutments and enclosed spans or sections, measure from back-to-back of backwalls or from paving notch to paving notch inclusive of the vaulted abutments and enclosed spans.	The total bridge length measurement can be used with the bridge width out-to-out to calculate an estimated deck area. The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The total bridge length for curved bridges is measured along the curved centerline.

B.G.02 – Total Bridge Length (2 of 4)

Examples – Total Bridge Length

Report measurement A.

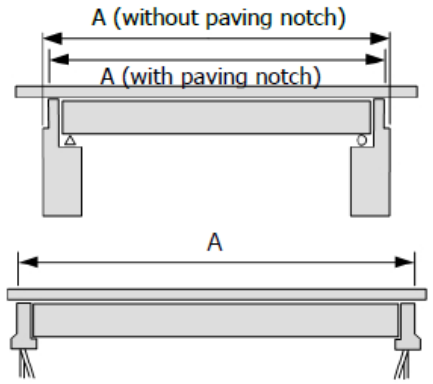
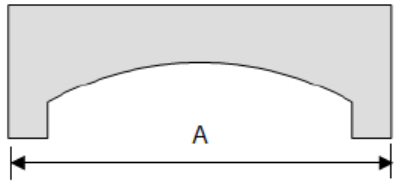
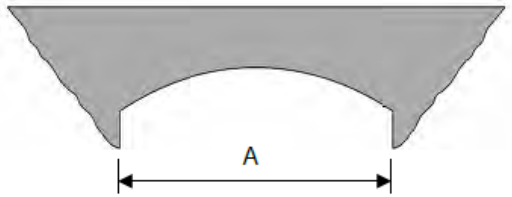


Figure 19. Profile views of various single span bridges.

Report measurement A.



Defined backwall or paving notch



No defined backwall or paving notch

Figure 20. Profile views of various spandrel arches.

Report measurement A.

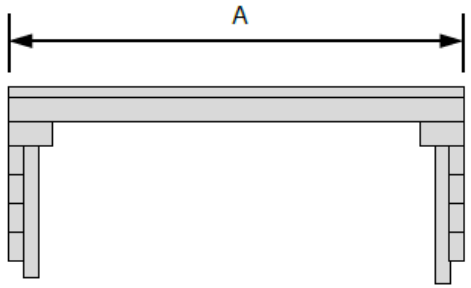


Figure 21. Profile view of a single span bridge with pile bent abutments.

B.G.02 – Total Bridge Length (3 of 4)

Examples Continued – Total Bridge Length

Report measurement A.

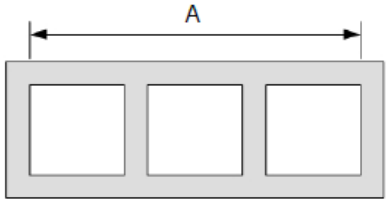


Figure 22. Profile view of a four-sided, multi-cell culvert under fill.

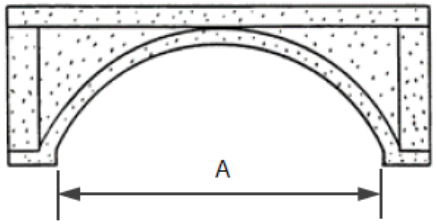


Figure 23. Profile view of a culvert under fill.

Report measurement A.

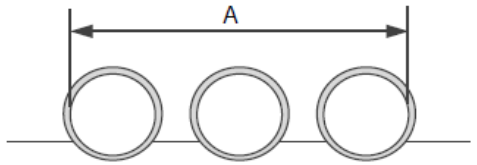


Figure 24. Profile view of a multi-pipe culvert under fill.

Four span bridge with variable skews. Total bridge length is measured along the roadway centerline from back-to-back of backwalls at abutments. Report 477.6.

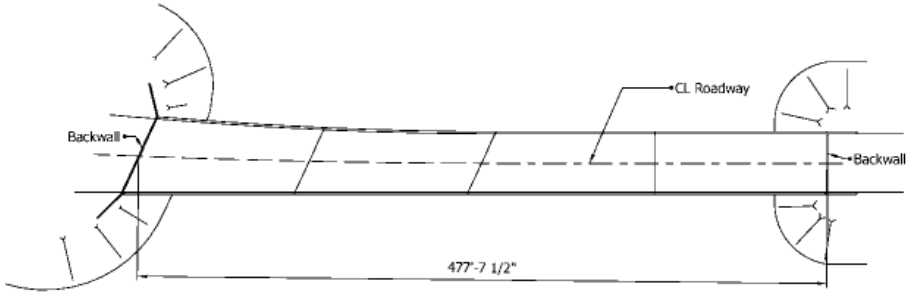


Figure 25. Plan view of a four-span bridge with variable skews.

B.G.02 – Total Bridge Length (4 of 4)

Three span curved bridge. Total bridge length is measured along the roadway centerline from back-to-back of backwalls at abutments. Report 504.0.

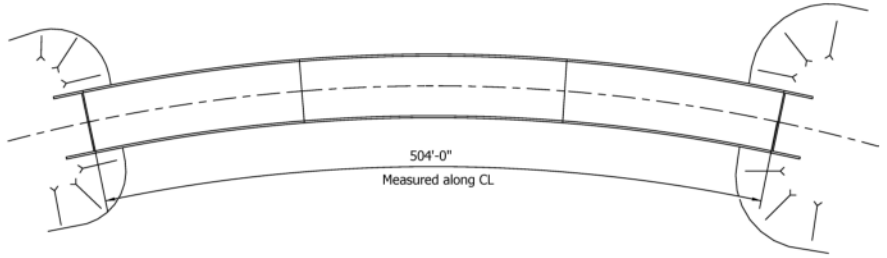


Figure 26. Plan view of a three-span curved bridge.

Skewed pipe bridge under a highway has an opening of 20.85 ft measured along the roadway centerline. Report 20.9.

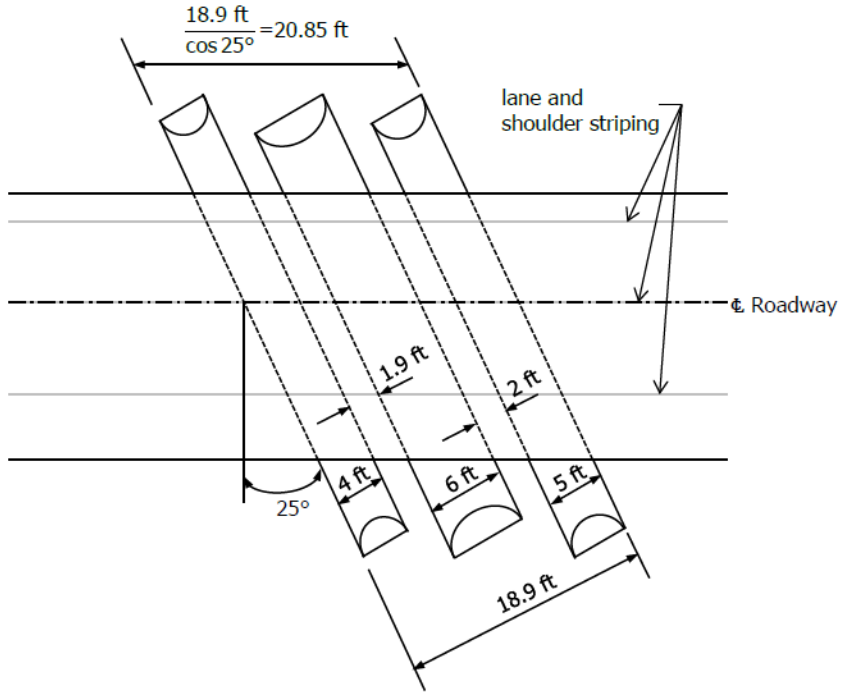
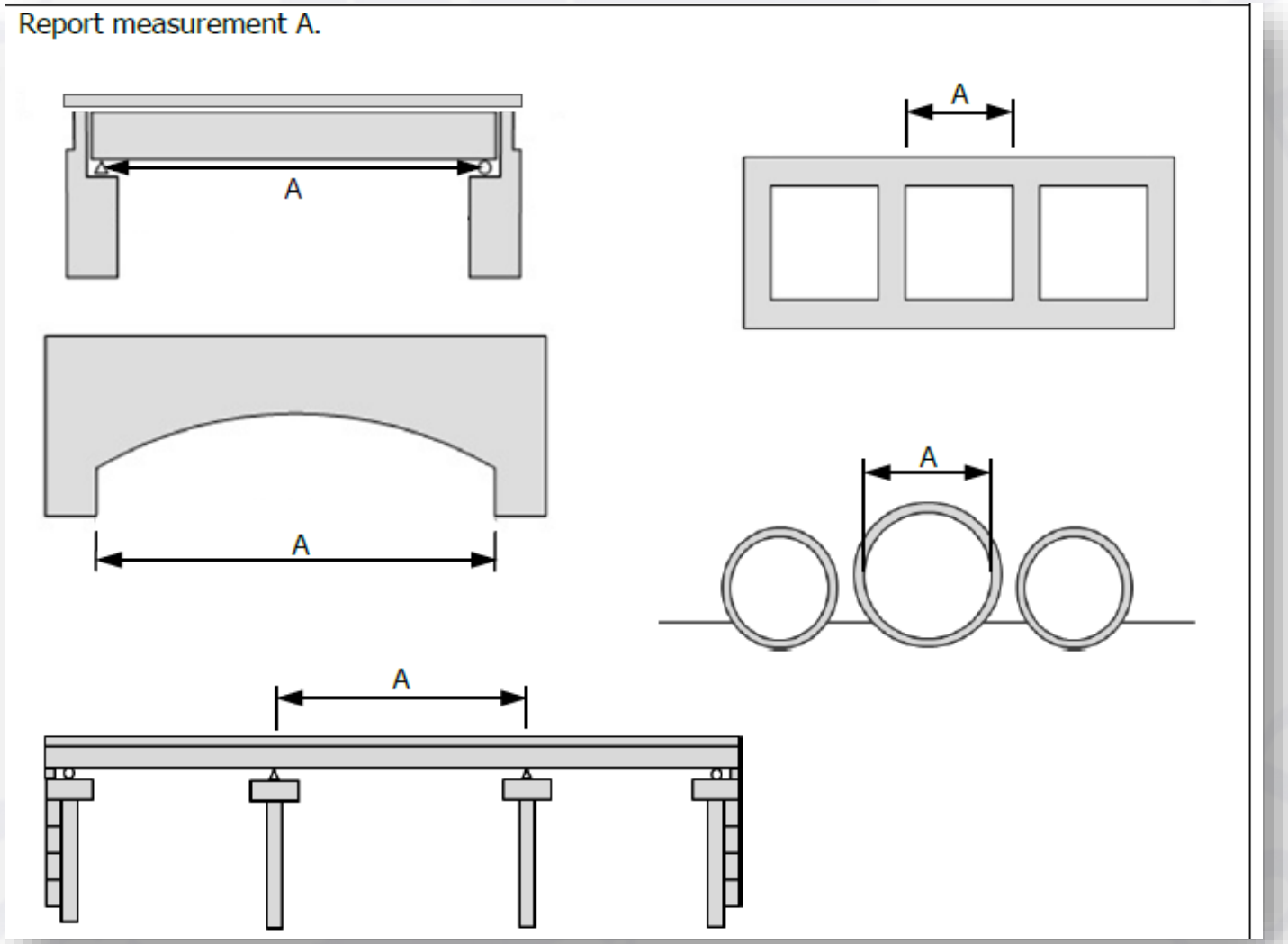


Figure 27. Plan view of a skewed, multi-pipe culvert under fill.

B.G.03 – Maximum Span Length (1 of 2)

Maximum Span Length		
Format N (5,1)	Frequency I	Item ID B.G.03
Specification	Commentary	
Report the length of the maximum span to the nearest tenth of foot, measured from centerline of bearing to centerline of bearing, along the roadway centerline.	For rigid frames, arches, pipes, integral abutments, or similar type bridges where there is not a clear centerline of bearing, use the clear open distance between piers, bents, walls, or abutments. The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved bridges would be measured along the curved centerline. For bridges with single spans this item has the same value as B.G.04 *(Minimum Span Length).*	

B.G.03 – Maximum Span Length (2 of 2)



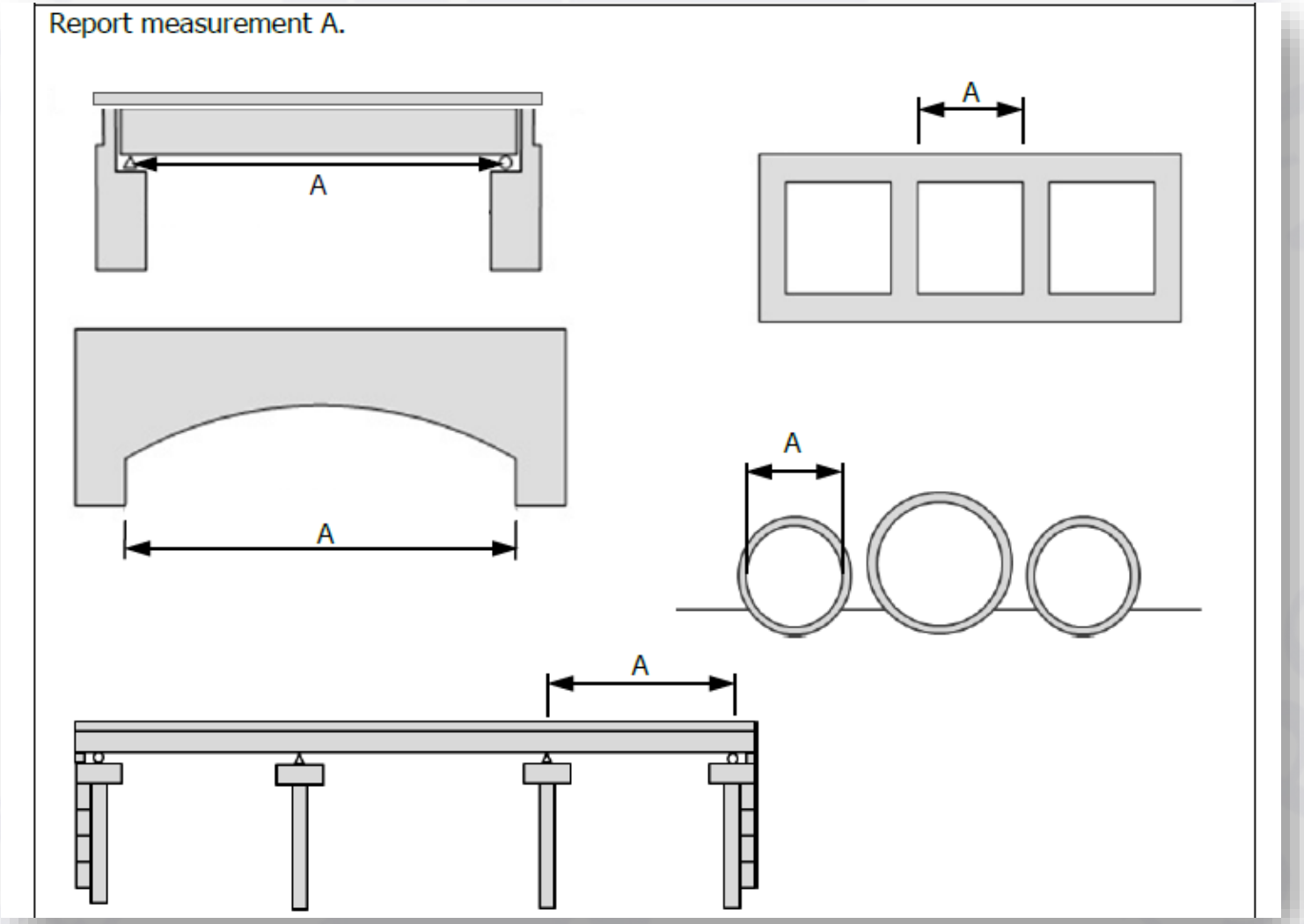
B.G.04 – Minimum Span Length (1 of 2)

Minimum Span Length		
Format N (5,1)	Frequency I	Item ID B.G.04

Specification	Commentary
Report the length of the minimum span to the nearest tenth of foot, measured from centerline of bearing to centerline of bearing, along the roadway centerline.	For rigid frames, arches, pipes, integral abutments, or similar type bridges where there is not a clear centerline of bearing, use the clear open distance between piers, bents, or abutments.

Commentary Continued
The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved bridges is measured along the curved centerline. For bridges with single spans this item has the same value as B.G.03 *(Maximum Span Length)*.

B.G.04 – Minimum Span Length (2 of 2)



B.G.05 – Bridge Width Out-to-Out (1 of 2)

Bridge Width Out-to-Out		
Format N (4,1)	Frequency I	Item ID B.G.05

Specification	Commentary
Report the minimum out-to-out width measured perpendicular to the centerline of the roadway to the nearest tenth of a foot. For multiple (double) deck bridges that are inventoried as one bridge, measure all levels, and report the sum of the measurements to account for the total width carried on the bridge. For bridges under fill, measure the width from out-to-out of the headwalls or barrel ends. For sidehill bridges, measure the out-to-out structure width. For bridges that carry multiple types of service, for example highway, pedestrian, and railroad, measure the out-to-out width that encompasses all service types.	For bridges under fill, the reported value can be limited to the width of the roadway section over the bridge for unusual situations where the bridge continues far beyond the roadway cross-section, and a lesser width would likely be constructed for a replacement project. For bridges under fill, in which the features that define the out-to-out width are not parallel, report the minimum out-to-out width.

B.G.05 – Bridge Width Out-to-Out (2 of 2)

Report measurement A.

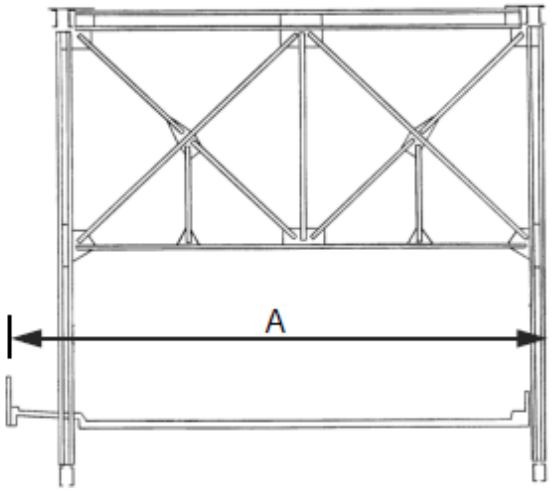


Figure 34. Cross-section view of a through truss bridge.

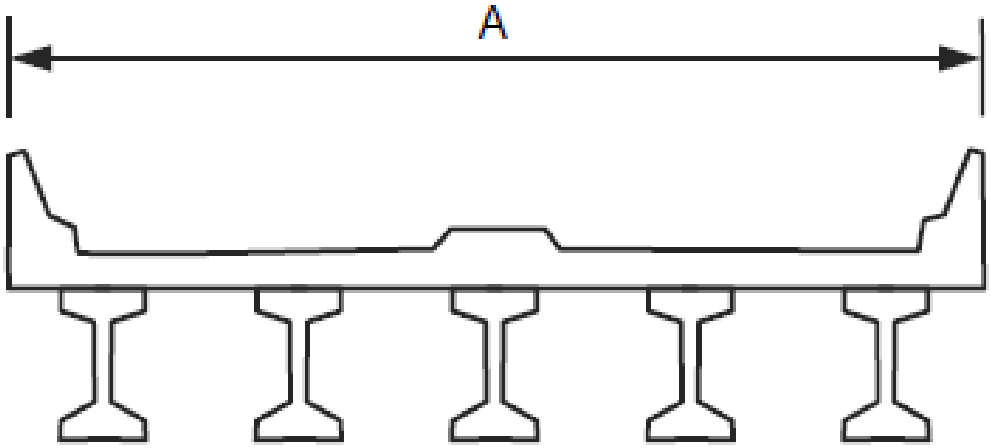


Figure 36. Cross-section view of a multi-girder bridge.

Report measurement A.

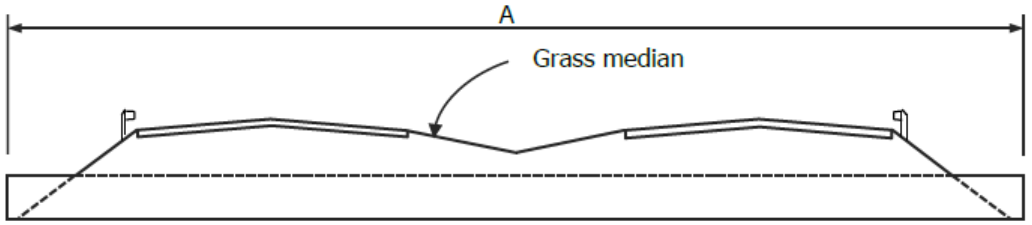


Figure 38. Cross-section view of a pipe culvert under fill.

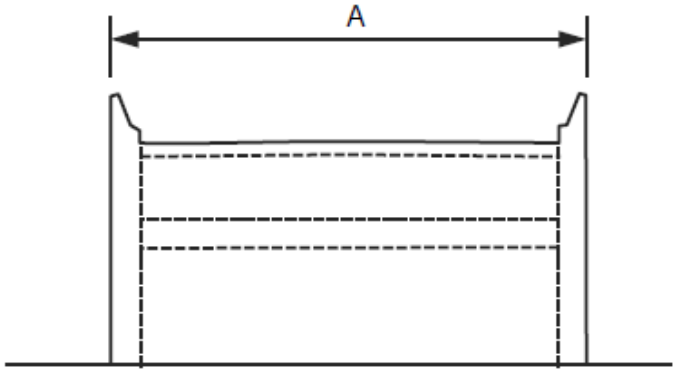


Figure 37. Cross-section view of a filled arch bridge or culvert under fill with headwalls.

B.G.06 – Bridge Width Curb-to-Curb (1 of 2)

Bridge Width Curb-to-Curb		
Format N (4,1)	Frequency I	Item ID B.G.06

Specification	Commentary
Report the sum of the most restrictive minimum usable distances for all roadways carried by the bridge. Measure the distance on the bridge perpendicular to the centerline of the roadway between curbs or rails to the nearest tenth of a foot. Exclude from the usable distance measurement medians, sidewalks, structurally inadequate shoulders, and other non-mountable areas. The measurement for this item shall be compatible with the measurements used for Item B.H.08 *(Lanes On Highway)*, Item B.G.09 *(Approach Roadway Width)*, and Item B.H.09 *(Annual Average Daily Traffic)*. For multiple (double) deck bridges that are inventoried as one bridge, measure all levels, and report the sum of the most restrictive minimum usable distances carried by the bridge. For sidehill bridges measure the actual full curb-to-curb roadway width. For bridges that carry multiple types of service, for example highway, pedestrian, and railroad, report the usable distance that serves the highway service as denoted by curb or barrier separation, or other delineation that separates the service types.	Usable roadway width includes the width of traffic lanes and the widths of shoulders. Shoulders must be contiguous with the traveled way and must be structurally adequate for all weather and traffic conditions consistent with the facility carried. Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane is not to be considered a shoulder for this item. Refer to agency policy for when and where stabilized shoulders are used. When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized. For bridges under fill, the usable roadway width crossing the bridge is commonly the same value reported for Item B.G.09 *(Approach Roadway Width)*. A barrier or curb greater than 6 inches high may be considered non-mountable for these specifications.

B.G.06 – Bridge Width Curb-to-Curb (2 of 2)

Report measurement A.

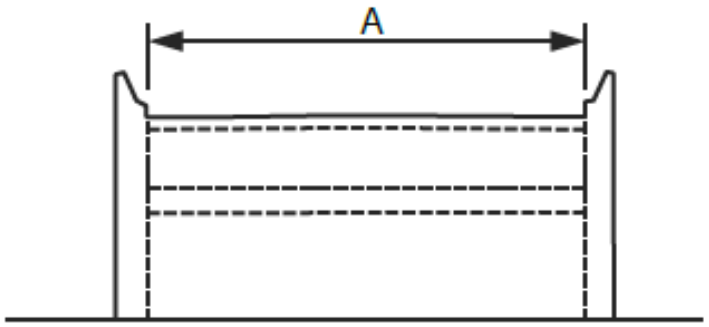


Figure 45. Cross-section view of a filled arch bridge or culvert under fill with headwalls.

Report measurement A.

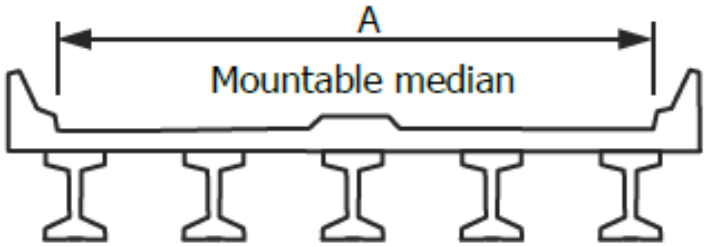


Figure 46. Cross-section view of a multi-girder bridge.

Report the sum of A+B.

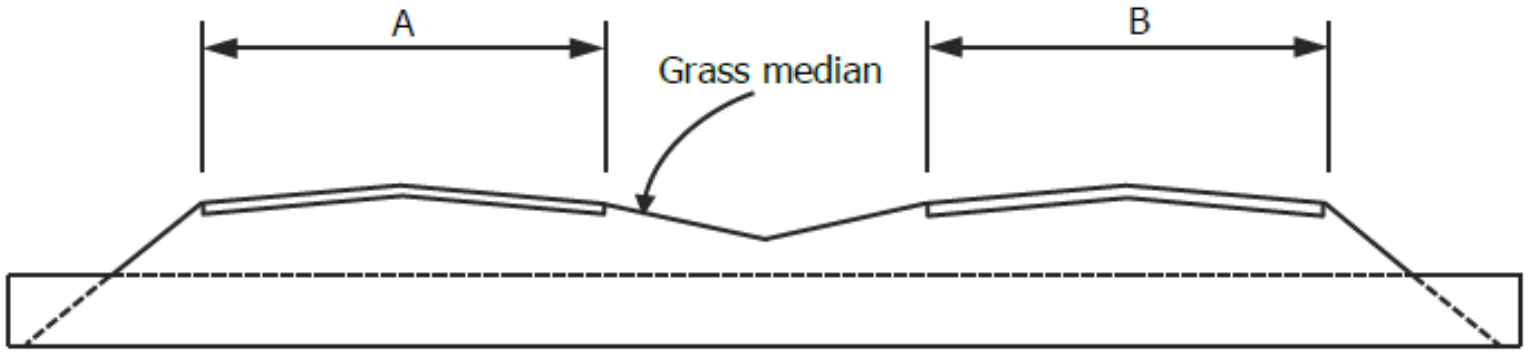


Figure 47. Cross-section view of a pipe culvert under fill.

Report measurement A.

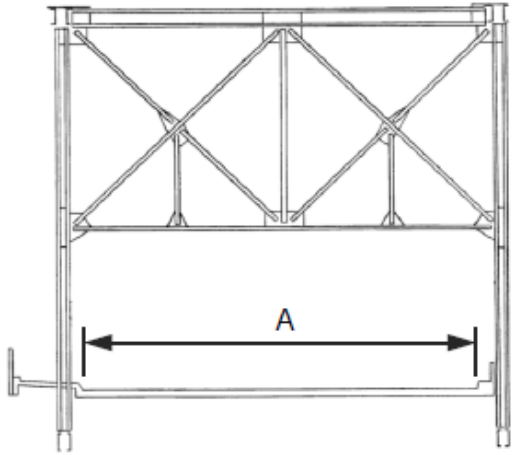


Figure 44. Cross-section view of a through truss bridge.

B.G.07 – Left Curb or Sidewalk Width

Left Curb or Sidewalk Width

Format	Frequency	Item ID
N (3,1)	I	B.G.07

Specification	Commentary
Report the minimum width of the left curb or sidewalk to the nearest tenth of a foot from the face of bridge rail to the face of curb. Measure the width perpendicular to the centerline of the roadway. Report 0.0 when the face of the curb does not extend beyond the face of the bridge rail. Report 0.0 when there is no left curb or sidewalk.	Left and right are determined based on the direction of the inventoried route carried by the bridge, commonly west to east or south to north. When a defined longitudinal joint exists between the curb and the sidewalk, such as a granite curb and concrete sidewalk, measure the width from the face of bridge rail to the face of the granite curb.

Examples

Report measurement C.

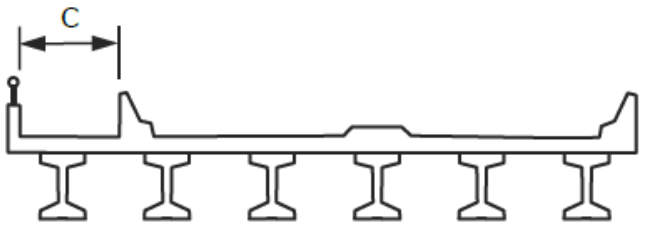


Figure 52. Cross-section view of a multi-girder bridge.

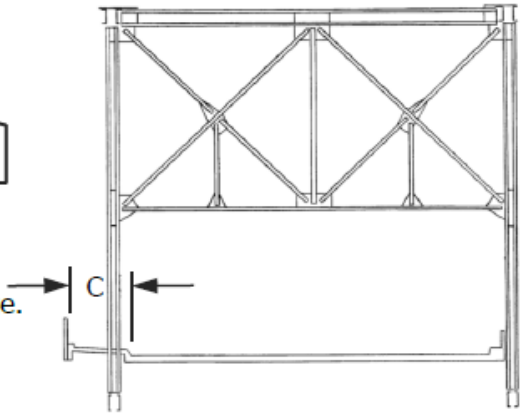


Figure 53. Cross-section view of a through truss bridge.

B.G.08 – Right Curb or Sidewalk Width (1 of 2)

Right Curb or Sidewalk Width		
Format N (3,1)	Frequency I	Item ID B.G.08
Specification	Commentary	
Report the minimum width of the right curb or sidewalk to the nearest tenth of a foot from the face of bridge rail to the face of curb. Measure the width perpendicular to the centerline of the roadway. Report 0.0 when the face of the curb does not extend beyond the face of the bridge rail. Report 0.0 when there is no right curb or sidewalk.	Right and left is determined based on the direction of the inventoried route carried by the bridge, commonly west to east or south to north. When a defined longitudinal joint exists between the curb and the sidewalk, such as a granite curb and concrete sidewalk, measure the width from the face of bridge rail to the face of the granite curb.	

B.G.08 – Right Curb or Sidewalk Width (2 of 2)

Report measurement C.

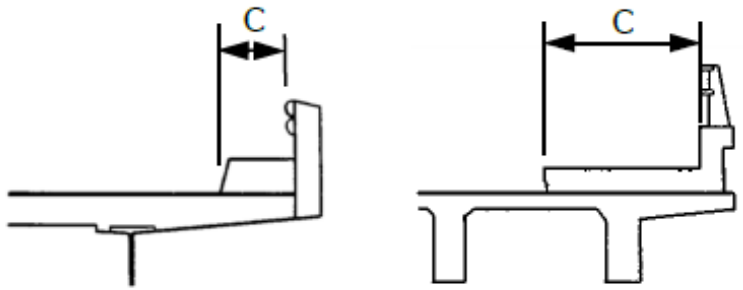


Figure 58. Partial cross-section views of various bridge decks with railings.

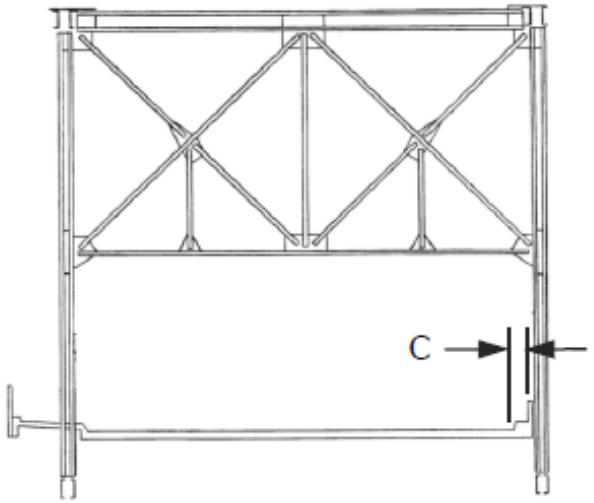


Figure 59. Cross-section view of a through truss bridge.

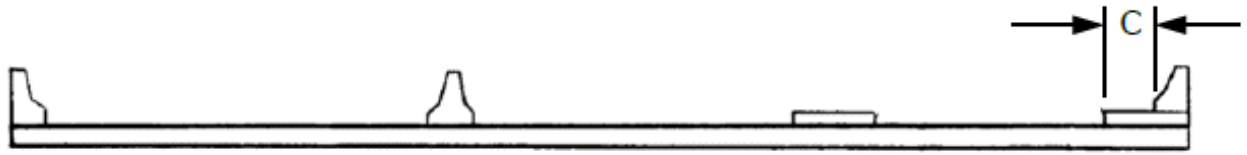


Figure 60. Cross-section view of a slab bridge with various medians.

B.G.09 – Approach Roadway Width (1 of 2)

Approach Roadway Width		
Format N (4,1)	Frequency I	Item ID B.G.09
Specification	Commentary	
Report the minimum usable approach roadway width measured to the nearest tenth of a foot. Measure the distance perpendicular to the centerline of the roadway between curbs or rails that is representative of the approach roadway within 100 feet of the bridge. Exclude from the usable distance measurement: medians, sidewalks, and other protected areas with non-mountable curbs or barriers. Report the lesser of the two approach roadway widths for bridges that carry two-way traffic. Report the width at the approach end for bridges that carry one-way traffic.	Usable roadway width includes the width of traffic lanes and the width of shoulders. Shoulders must be contiguous with the traveled way and must be structurally adequate for all weather and traffic conditions consistent with the facility carried. Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane is not to be considered a shoulder for this item. Refer to agency policy for when and where stabilized shoulders are used. When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized. A curb greater than 6 inches high may be considered non-mountable for these specifications.	

B.G.09 – Approach Roadway Width (2 of 2)

Both roadways are carried on one bridge. Report the sum of measurements A and B.

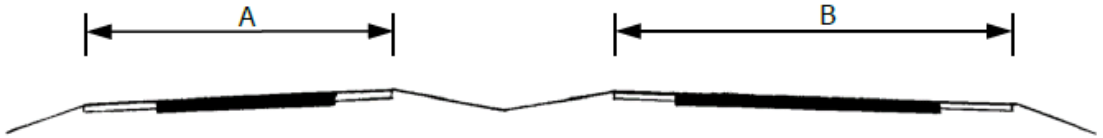


Figure 64. Cross-section view of two approach roadways that are carried across one bridge.

Mainline and Ramp are both carried on one bridge. Report the sum of measurements A and B.

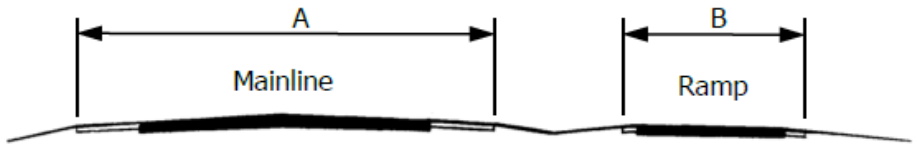


Figure 65. Approach roadway cross-section view for a mainline and a ramp that are carried across one bridge.

Mainline and Ramp are carried on separate bridges.

- Report measurement A for the Mainline bridge.
- Report measurement B for the Ramp bridge.

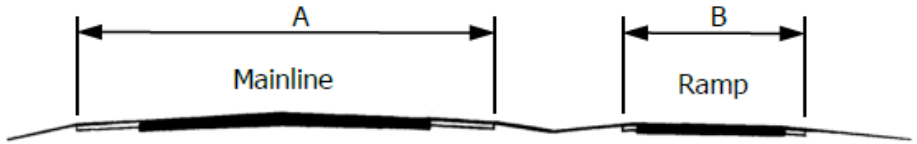


Figure 66. Approach roadway cross-section view for a mainline and a ramp that are carried across separate bridges.

B.G.10 – Bridge Median (1 of 2)

Bridge Median

Format	Frequency	Item ID
AN (1)	I	B.G.10

Specification	Commentary
Report the type of bridge median using one of the following codes. Code – Description 0 – No median 1 – Open median 2 – Closed median (mountable) 3 – Closed median (non-mountable)	A barrier or curb greater than 6 inches high may be considered non-mountable for these specifications. For bridges with a longitudinal joint, use code 1 when traffic cannot safely traverse the joint width. If the joint width is safely traversable, use one of the remaining codes. Joint condition does not affect the coding of this item.

Commentary Continued

Use code 0 for bridges that do not have a median, including bridges that carry adjacent traffic lanes separated only by centerline, edge line, or channelization striping, with or without a traversable longitudinal joint.

Use code 2 for bridges with medians that are either flush or mountable, with or without a traversable longitudinal joint, including areas that are striped to designate a median.

B.G.10 – Bridge Median (2 of 2)

Each example represents a single bridge.

Report 1.

Open median

Figure 67. Cross-section view of a bridge deck with open median.

Report 2.

Closed median (mountable)

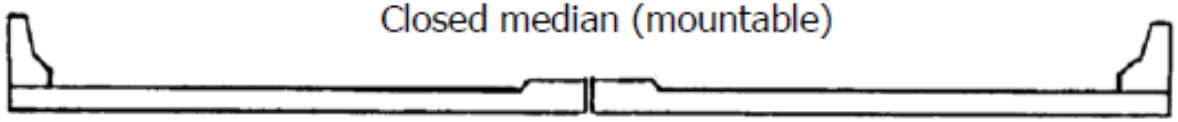


Figure 68. Cross-section view of a bridge deck with closed median (mountable)

Report 3.

Closed Median (non-mountable)

Figure 69. Cross-section view of a bridge deck with closed median (non-mountable).

B.G.11 – Skew

Skew

Format	Frequency	Item ID
N (2,0)	I	B.G.11

Specification	Commentary
Report the skew angle to the nearest degree. Measure the skew angle between the centerline of a substructure unit and a line perpendicular to the roadway centerline. Report the maximum skew when skews vary amongst substructure units. Report 0 if there is no skew.	The skew angle can be taken directly from the plans, if available, or measured in the field.

Example

Report the skew as the result of $Sin^{-1}(A/C)$, $Cos^{-1}(B/C)$ or $Tan^{-1}(A/B)$.

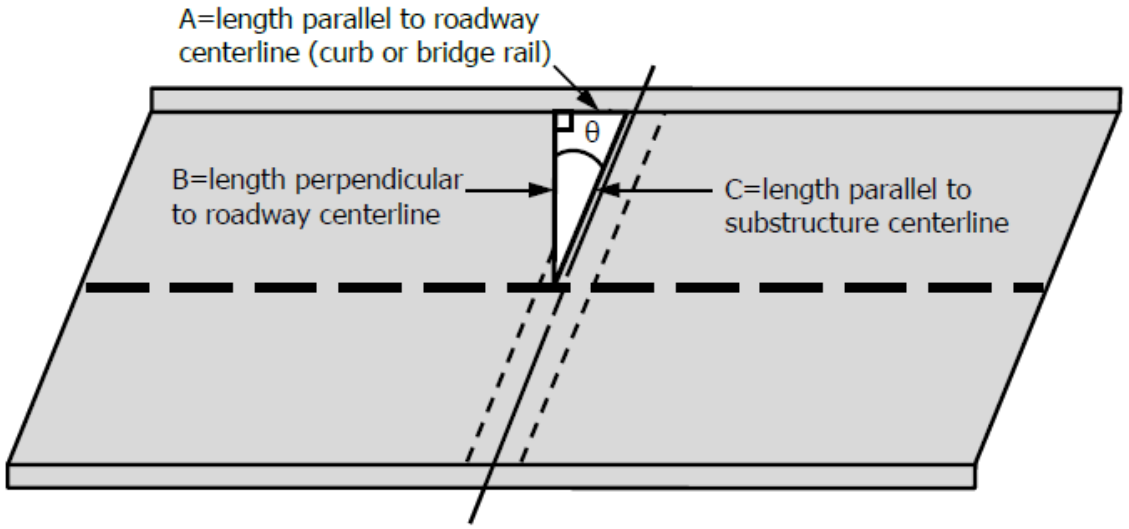


Figure 70. Plan view of a bridge deck indicating skew determination.

B.G.12 – Curved Bridge (1 of 2)

Curved Bridge		
Format AN (2)	Frequency I	Item ID B.G.12

Specification	Commentary
Report whether the bridge is horizontally curved using one of the following codes. Code – Description CU – Curved girder(s) CP – Piecewise straight girders CK – Kinked girder(s) N – Not curved	A bridge is considered horizontally curved when at least one girder line forms a curve using either a curved girder(s), piecewise straight girders forming a segmented/chorded curve, or a kinked girder(s). For this specification, a piecewise straight girder line is comprised of girders with a longitudinal axis that changes orientation at one or more supports. The girder line may be simply supported or continuous at supports. A kinked girder is a girder with a longitudinal axis that changes orientation at a location(s) along the girder length excluding at the supports. Diaphragm and cross-frame members in horizontally curved bridges are primary members. Use code N for bridges that have curved deck geometry, or may be striped as curved, but the girders do not form a curve.

B.G.12 – Curved Bridge (2 of 2)

Report CP.

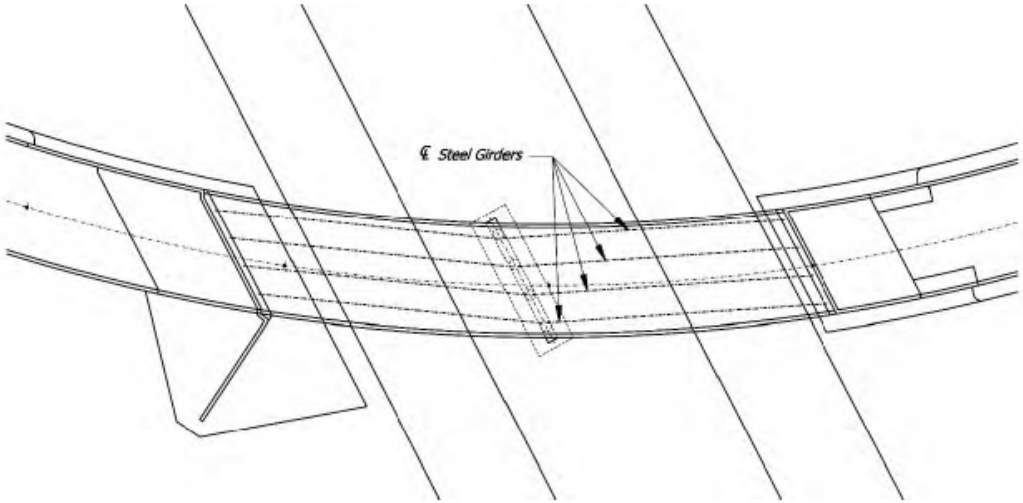


Figure 72. Plan view of a curved bridge with piecewise straight girders.

Report CK.

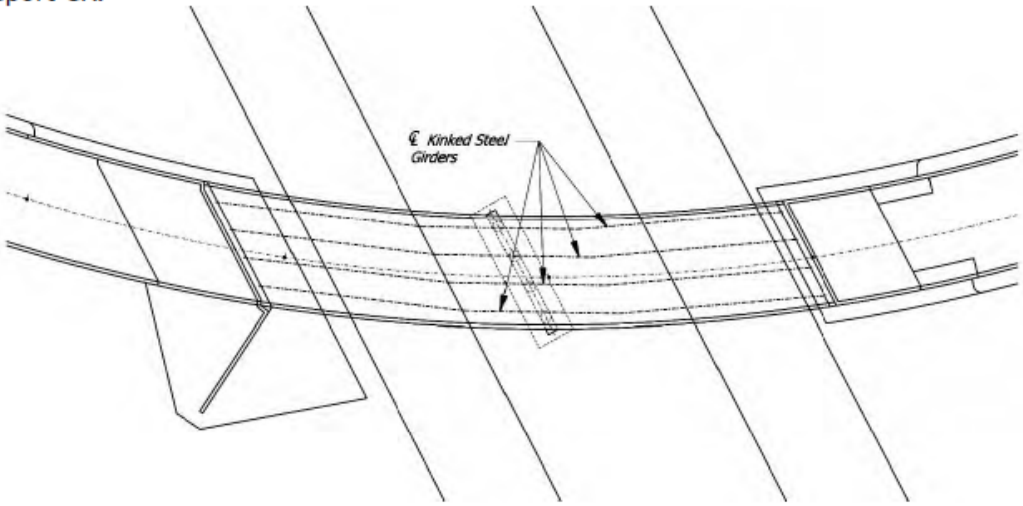


Figure 73. Plan view of a curved bridge with kinked girders.

B.G.13 – Maximum Bridge Height (1 of 2)

Maximum Bridge Height		
Format N (4,0)	Frequency I	Item ID B.G.13
Specification	Commentary	
Record the maximum height from top of deck to ground line or water surface elevation, whichever yield the largest value, rounded to the nearest foot.	For double-deck bridges inventoried as one bridge, measure from top of deck of the lower deck. For double-deck bridges inventoried as two bridges, measure from the top of deck of the inventoried bridge. Ground line represents dry terrain, pavement, or waterway bottom. Use the water surface elevation at the time the value for this item is established. This item may be estimated by field observation or from plans when it is not practical or is infeasible to measure, or height is more than 30 ft. This item does not need to be updated due to fluctuations in water surface elevation.	

B.G.13 – Maximum Bridge Height (2 of 2)

Bridge carries SR170 over Felix Creek and County Trail. Report 27.

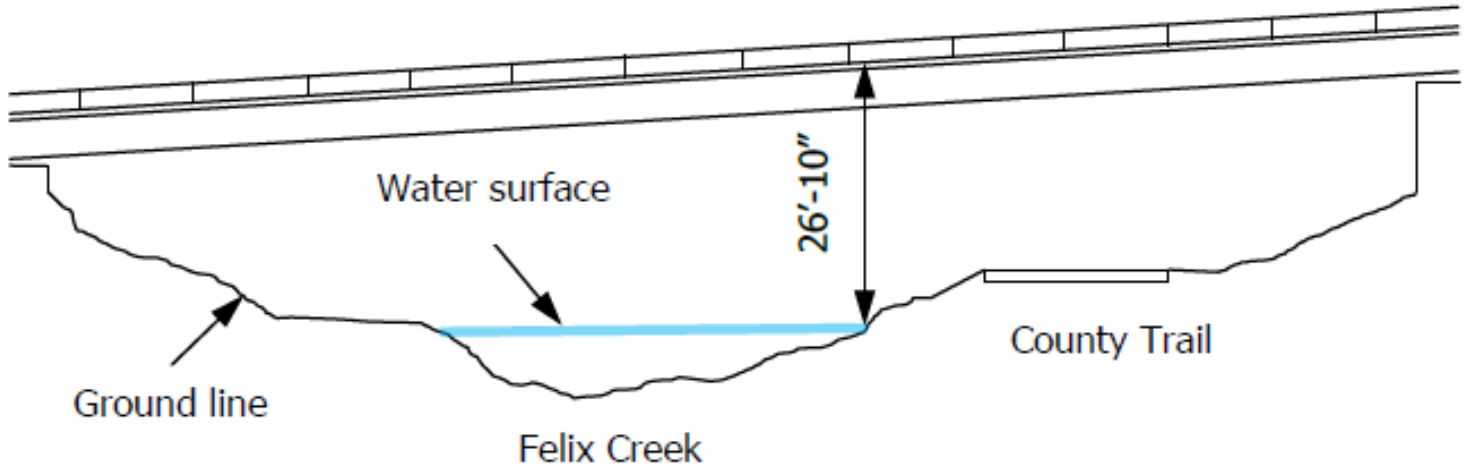


Figure 74. Profile view of a bridge over a creek and trail.

B.G.14 – Sidehill Bridge

Sidehill Bridge		
Format AN (1)	Frequency I	Item ID B.G.14

Specification	Commentary
Report whether any portion of the bridge is a sidehill structure. Code – Description N – Not a sidehill bridge Y – Is a sidehill bridge	A sidehill bridge is a structure built onto the side of terrain or earth material with the roadway centerline running nearly parallel to the face of the terrain or material. The roadway is carried partially on structure and partially on terrain that has been modified by cutting or filling to form the required roadway subgrade elevation. For sidehill bridges, Item B.G.06 *(Bridge Width Curb-to-Curb)* is typically larger than Item B.G.05 *(Bridge Width Out-to-Out)*. For sidehill bridges with irregular geometry, reporting the actual deck area in Item B.G.15 *(Irregular Deck Area)* provides a more accurate value than using the default calculation described for that item. Use code N when no portion of the bridge is a sidehill structure.

B.G.15 – Irregular Deck Area

Irregular Deck Area		
Format N (10,1)	Frequency I	Item ID B.G.15
Specification		Commentary
Report the total deck area rounded to the nearest tenth of a square foot. Only report this item when the actual area is obtained from plans or measurement of bridges with irregular geometry. The limits of measurement shall be in accordance with Items B.G.05 *(Bridge Width Out-to-Out)* and B.G.02 *(Total Bridge Length)*. For bridges that carry multiple types of service, for example highway and railroad, report the deck area that encompasses all service types.		Reporting the deck area calculated from plans may more accurately reflect the deck area for bridges with unusual geometry (e.g. flared, sidehill, or bifurcated structures), or through structures with cantilevered sidewalks. This item can improve the accuracy of national performance measure computations, estimating cost, etc.

B.G.16 – Calculated Deck Area

Calculated Deck Area		
Format N (10,1)	Frequency C	Item ID B.G.16
Specification	Commentary	
Do not report this item as it is calculated by FHWA. The default calculation for bridges is the value reported in Item B.G.05 *(Bridge Width Out-to-Out)* multiplied by the value reported in Item B.G.02 *(Total Bridge Length)* rounded to the nearest tenth of a square foot.		

SNBI Section 6: Inspections

Bill Dittrich & Joshua Biller

Subsection 6.1: Inspection Requirements – Overview

- Non-routine inspection types and special inspection features
- Part of Primary Data Set
- One-to-one relationship with asset
- Typically static once a bridge has been inventoried

Subsection 6.1: Inspection Requirements – Items

- B.IR.01 – NSTM Inspection Required
- B.IR.02 – Fatigue Details
- B.IR.03 – Underwater Inspection Required
- B.IR.04 – Complex Feature

Subsection 6.1: Inspection Requirements – Crosswalk

- Data Crosswalk (https://www.fhwa.dot.gov/bridge/snbi/datacrosswalk.cfm)

Transition of Over Records

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide Format (as shown in Appendix E)	Clean Transition?	Transition Notes for Developer	Additional Notes
B.IR.01	BIR01	NSTM Inspection Required	AN (1)	92A	Critical Feature Inspection- Fracture Critical Details	3/AN	Yes	Direct transition.	
B.IR.02	BIR02	Fatigue Details	AN (1)	N/A			No		
B.IR.03	BIR03	Underwater Inspection Required	AN (1)	92B	Critical Feature Inspection - Underwater Inspection	3/AN	Yes	Direct transition.	
B.IR.04	BIR04	Complex Feature	AN (1)	N/A			No		

B.IR.01 – NSTM Inspection Required

NSTM Inspection Required

Format	Frequency	Item ID
AN (1)	I	B.IR.01

Specification

Report whether the bridge requires an NSTM inspection using one of the following codes.

Code	Description
N	NSTM inspection not required.
Y	NSTM inspection required.
I	NSTM inspection not required – Internal Redundancy
S	NSTM inspection not required – System Redundancy

Do not report this item for bridges that do not have steel members, as indicated in Items B.SP.04 *(Span Material)* and B.SB.03 *(Substructure Material)*.

Commentary

The intent of this item is to identify bridges that require NSTM inspection for any part of the bridge, to ensure they are inspected in accordance with the NBIS.

It is the State's option to record a required NSTM inspection for any bridges meeting a State definition more rigorous than the FHWA definition of NSTM inspection.

Use code N when an NSTM inspection is not required and codes I and S do not apply.

Use code I when the bridge owner has demonstrated to FHWA, through the use of nationally recognized methods, that a member without load path redundancy is internally redundant, and it is determined that the bridge does not require an NSTM inspection.

Use code S when the bridge owner has demonstrated to FHWA, through the use of nationally recognized methods, that a bridge without load path redundancy is system redundant, and it is determined that the bridge does not require an NSTM inspection.

NextLevel INDIANA

B.IR.02 – Fatigue Details

Fatigue Details		
Format AN (1)	Frequency I	Item ID B.IR.02

Specification	Commentary
Report whether the bridge has AASHTO fatigue category E or E′ details using one of the following codes. Code — Description N — No E/E′ details Y — E/E′ details are present Do not report this item for bridges that do not have steel members as indicated in Items B.SP.04 *(Span Material)* and B.SB.03 *(Substructure Material)*.	This item provides data to identify bridges that have details most prone to fatigue. Refer to the BIRM or AASHTO LRFD Bridge Design Specifications for fatigue categories.

B.IR.03 – Underwater Inspection Required

Underwater Inspection Required

Format	Frequency	Item ID
AN (1)	I	B.IR.03

Specification

Report whether an underwater inspection is required under normal flow conditions using one of the following codes.

Code	Description
N	Underwater inspection not required
Y	Underwater inspection required

Do not report this item for bridges that do not pass over water as indicated in Item B.F.01 *(Feature Type)*.

Commentary

The intent of this item is to identify bridges that require an underwater inspection per the NBIS.

Use code Y when during a typical routine inspection, any portion of a bridge substructure and the surrounding channel cannot be inspected to the mudline at low water by wading or probing, generally requiring diving or other appropriate technique.

Use code N when during a typical routine inspection, all portions of a bridge substructure and the surrounding channel can be inspected to the mudline at low water by wading or probing.

If this item was previously reported as Y because an underwater inspection is generally required, it should continue to be reported as Y even for instances of unusually low flow where all portions of the substructure can be inspected by wading and probing, and an underwater inspection is not required. This applies only if the low flow condition is truly unusual and is not likely to reoccur during the next inspection interval.

The reported code for this item may change in the rare circumstance where long-term environmental conditions change for inspection access to underwater portions of the substructure.

NextLevel INDIANA

B.IR.04 – Complex Feature

Complex Feature		
Format AN (1)	Frequency I	Item ID B.IR.04

Specification	Commentary
Report whether the bridge has a complex feature by using one of the following codes. Code – Description N – Bridge does not have complex feature Y – Bridge has complex feature	The intent of this item is to identify bridges with complex features as defined by the NBIS. Bridges with complex features are typically identified in agency policies and procedures.

Subsection 6.2: Inspection Events – Overview

- Reported for each inspection performed
- Part of Inspections Data Set
- Many-to-one relationship with asset
- Can have more than one set of information for a given date (e.g. Routine and NSTM)
- Uniquely identifies each inspection, can report multiple inspections of same type during calendar year or between FHWA submittals (e.g. three Specials for an earthquake and aftershocks)

Subsection 6.2: Inspection Events – Items (1 of 2)

- B.IE.01 – Inspection Type
- B.IE.02 – Inspection Begin Date
- B.IE.03 – Inspection Completion Date
- B.IE.04 – Nationally Certified Bridge Inspector
- B.IE.05 – Inspection Interval
- B.IE.06 – Inspection Due Date

Subsection 6.2: Inspection Events – Items (2 of 2)

- B.IE.07 – Risk-Based Inspection Interval Method
- B.IE.08 – Inspection Quality Control Date
- B.IE.09 – Inspection Quality Assurance Date
- B.IE.10 – Inspection Data Update Date
- B.IE.11 – Inspection Note
- B.IE.12 – Inspection Equipment

Subsection 6.2: Inspection Events – Crosswalk

- Data Crosswalk (https://www.fhwa.dot.gov/bridge/snbi/datacrosswalk.cfm)

Transition of Over Records

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide Format (as shown in Appendix E)	Clean Transition?	Transition Notes for Developer	Additional Notes
B.IE.01	BIE01	Inspection Type	AN (1)	90/92/93	Inspection Date / Critical Feature Inspection / Critical Feature Inspection Date	4/N - 3/AN - 4/AN	Partial	See tab	
B.IE.02	BIE02	Inspection Begin Date	YYYYMMDD	90/93	Inspection Date / Critical Feature Inspection Date	4/N - 4/AN	Partial	See tab.	
B.IE.03	BIE03	Inspection Completion Date	YYYYMMDD	N/A			No		
B.IE.04	BIE04	Nationally Certified Bridge Inspector	AN (15)	N/A			No		
B.IE.05	BIE05	Inspection Interval	N (2,0)	91/92	Designated Inspection Frequency / Critical Feature Inspection	2/N - 3/AN	Partial	See tab.	
B.IE.06	BIE06	Inspection Due Date	YYYYMMDD	N/A			No		
B.IE.07	BIE07	Risk-Based Inspection Interval Method	AN (1)	N/A			No		
B.IE.08	BIE08	Inspection Quality Control Date	YYYYMMDD	N/A			No		
B.IE.09	BIE09	Inspection Quality Assurance Date	YYYYMMDD	N/A			No		
B.IE.10	BIE10	Inspection Data Update Date	YYYYMMDD	N/A			No		
B.IE.11	BIE11	Inspection Note	AN (300)	N/A			No		
B.IE.12	BIE12	Inspection Equipment	AN (120)	N/A			No		

NextLevel INDIANA

B.IE.01 – Inspection Type

Inspection Type

Format	Frequency	Item ID
AN (1)	EI	B.IE.01

Specification	Commentary
Report the inspection type or scour monitoring performed using one of the following codes. Code – Description 1 – Initial 2 – Routine 3 – Underwater 4 – NSTM 5 – Damage 6 – In-Depth 7 – Special 8 – Service 9 – Scour Monitoring	Use code 2 when all portions of a bridge substructure and the surrounding channel have been inspected to the mudline at low water visually, or by wading or probing during routine inspections. Use code 3 when all portions of a bridge substructure reported Y for Item B.IR.03 *(Underwater Inspection Required)* is inspected by wading and probing in an instance of unusually low flow. If this is performed during a Routine inspection, record both a routine and underwater inspection. Use code 9 when scour monitoring is performed as required by a Scour POA for a triggering storm event. This can include periodic remote electronic readings of streambed changes when required in the POA. If multiple site visits occur for a triggering storm event, record this item once for that storm event. Use code 8 when a Service Inspection is performed for a bridge with a risk-based routine inspection interval that exceeds 48 months.

B.IE.02 – Inspection Begin Date

Inspection Begin Date		
Format YYYYMMDD	Frequency EI	Item ID B.IE.02

Specification	Commentary
Report the date for the inspection type performed. For multiple day inspections, record the first day that field inspection begins.	The intent of this item is to record the inspection dates for the inspection types in Item B.IE.01 *(Inspection Type)*, since the previous data submittal to FHWA. If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the first site visit date for that storm event.

B.IE.03 – Inspection Completion Date

Inspection Completion Date		
Format YYYYMMDD	Frequency EI	Item ID B.IE.03
Specification	Commentary	
Report the completion date for the inspection type performed. For single day inspections, report the same date that field inspection begins.	The intent of this item is to record the field inspection completion dates for all inspections. If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the last site visit date for that storm event.	

B.IE.04 – Nationally Certified Bridge Inspector

Nationally Certified Bridge Inspector		
Format AN (15)	Frequency EI	Item ID B.IE.04

Specification	Commentary
Report the unique code identifying the Nationally Certified Bridge Inspector (team leader) responsible for the inspection type performed.	The intent of this item is to indicate the Nationally Certified Bridge Inspector (team leader) present at the inspection, for each inspection type required by the NBIS. The unique identifier code is assigned by the State DOT, Federal agency, or Tribal government. Agencies may choose not to report this item for inspection types defined in the NBIS that do not require a Nationally Certified Bridge Inspector (team leader), even if one is present during the inspection.

B.IE.05 – Inspection Interval

Inspection Interval		
Format N (2,0)	Frequency EI	Item ID B.IE.05
Specification	Commentary	
Report the planned interval in number of months between the current and next scheduled inspection for the type associated with Items B.IE.01 *(Inspection Type)* and B.IE.03 *(Inspection Completion Date)* items. Report 0 for damage inspections, scour monitoring inspections, or when a special inspection does not have a defined inspection interval.	The intent of this item is to record the planned interval at which the bridge is to be inspected per the NBIS and agency policies and procedures. This interval should be evaluated after each inspection, and adjusted as necessary.	

B.IE.06 – Inspection Due Date

Inspection Due Date		
Format YYYYMMDD	Frequency C	Item ID B.IE.06

Specification	Commentary
Do not report this item as it is calculated by the FHWA. The default calculation is the value reported in Item B.IE.03 *(Inspection Completion Date)* plus the value reported in Item B.IE.05 *(Inspection Interval)*.	The intent of this item is to provide the inspection due date for the inspection types defined in the B.IE.01 *(Inspection Type)* where applicable. This item is only calculated for inspection types which have an inspection interval.

B.IE.07 – Risk-Based Inspection Interval Method

Risk-Based Inspection Interval Method

Format	Frequency	Item ID
AN (1)	EI	B.IE.07

Specification	Commentary
Report the risk-based inspection interval method using one of the following codes. Code – Description N – Not applicable 1 – Method 1 2 – Method 2	The intent of this item is to record the risk-based inspection interval method, described in the NBIS, for determining the inspection interval. Method 1, as described in the NBIS, is when inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk levels with an inspection interval not to exceed 12, 24, or 48 months. Method 2, as described in the NBIS, is when inspection intervals are determined by a more rigorous assessment of risk to classify each bridge, or a group of bridges, into one of four risk levels with an inspection interval not to exceed 12, 24, 48, or 72 months. Use code N when Item B.IE.01 *(Inspection Type)* is 1, 5, 6, 7, 8 or 9.

B.IE.08 – Inspection Quality Control Date

Inspection Quality Control Date		
Format YYYYMMDD	Frequency EI	Item ID B.IE.08
Specification	Commentary	
Report the date that the QC review was completed. Do not report when a QC review was not performed.	The intent of this item is to identify inspections that have had independent QC reviews to maintain inspection quality at or above a specified level. Agency QC procedures often vary, and every inspection might not receive an independent QC review. Bridge inspections might be selected for QC reviews based on representative bridge types or other agency defined methods.	

B.IE.09 – Inspection Quality Assurance Date

Inspection Quality Assurance Date		
Format YYYYMMDD	Frequency EI	Item ID B.IE.09

Specification	Commentary
Report the date that the QA review was completed. Do not report when a QA review was not performed.	The intent of this item is to identify inspections that have had independent QA reviews to measure or verify the overall quality of the inspection program. Agency QA procedures often vary in the definition of a review period and number of inspections reviewed. Bridge inspections might be randomly selected for agency QA reviews or selected based on representative bridge type, region, district, or other agency defined bridge populations.

B.IE.10 – Inspection Data Update Date

Inspection Data Update Date		
Format YYYYMMDD	Frequency EI	Item ID B.IE.10
Specification	Commentary	
Report the date that the NBI inspection data were entered or updated in the State transportation department, Federal agency, or Tribal government inventory.	The intent of this item is to verify that a complete NBI inspection data set is accepted and is entered or updated in the inventory within the timeframes required by the NBIS.	

B.IE.11 – Inspection Note

Inspection Note		
Format AN (300)	Frequency EI	Item ID B.IE.11

Specification	Commentary
Report a brief description of the members or features inspected when limited portions of the bridge are inspected. Use consistent terms to describe similar inspections.	This item is intended to capture a brief description of the members inspected when limited portions of the bridge are inspected such as for Underwater, NSTM, In-depth, Special, and Damage inspections, or for scour monitoring. This item is also used to describe the purpose for Special inspections performed following extreme events such as floods, hurricanes, and earthquakes.

B.IE.12 – Inspection Equipment (1 of 3)

Inspection Equipment		
Format AN (120)	Frequency EI	Item ID B.IE.12
Specification	Commentary	
Report all access and inspection equipment used to perform the inspection using one or more of the following codes. Report multiple codes separated by pipe (|) delimiters. Do not report this item if none of the equipment below was used.	This item is used to provide information about access and inspection equipment used in addition to standard equipment for each inspection. Remotely operated vehicles include any remotely controlled device used to provide video access to members of a bridge via ground, water surface, or underwater.	

B.IE.12 – Inspection Equipment (2 of 3)

Code	Description
	Access
AN	No access equipment used
A01	Ladder
A02	Bucket lift vehicle
A03	Under bridge inspection vehicle
A04	Rigging
A05	Waders
A06	Boat
A07	Snorkel
A08	SCUBA
A09	Surface supplied air
A10	Remotely Operated Vehicle (ROV)
A11	Video pole
A12	Borescope
A13	Unmanned aerial systems (UAS)
A14	Service Traveler
AX	Other

Use code AN when none of the listed access equipment codes apply for the inspection performed.

Use code A13 when unmanned aerial systems (UAS), also referred to as drones, are used to supplement inspections.

Use code IN when none of the listed inspection equipment codes apply for the inspection performed.

Use code I13 when underwater imaging technologies such as side scan sonar are used to supplement underwater inspections.

NDE and testing inspection equipment listed represent only more common or general types. Use the most closely related code, or use code IX for types not listed.

NextLevel INDIANA

B.IE.12 – Inspection Equipment (3 of 3)

Code	Description
	Inspection
IN	No inspection equipment used
I01	Ultrasonic
I02	Ground-penetrating radar
I03	Infrared thermography
I04	Radiographic testing
I05	Impact echo
I06	Electromagnetic methods
I07	Rebound & penetration methods
I08	Acoustic emissions testing
I09	Dye penetrant
I10	Magnetic particle
I11	Eddy current
I12	Boring or drilling
I13	Underwater imaging
I14	Depth finder/fathometer
I15	Stress wave timer
IX	Other

SNBI Sub-Section 7.5: Work Events

Bill Dittrich & Joshua Biller

Subsection 7.5: Work Events – Overview

- Year the bridge was built, and subsequent work performed
- Information to assist in identifying the age of the bridge, substantiate condition rating changes, and assess service life
- Part of Primary Data Set, with one-to-one relationship for B.W.01
- Part of Work Data Set, with many-to-one relationships for B.W.02 & B.W.03

Subsection 7.5: Work Events – Items

- B.W.01 – Year Built
- B.W.02 – Year Work Performed
- B.W.03 – Work Performed

Subsection 7.5: Work Events – Crosswalk

- Data Crosswalk (https://www.fhwa.dot.gov/bridge/snbi/datacrosswalk.cfm)

Transition of Over Records

SNBI ID	Data Tag	SNBI Item Name	SNBI Format	1995 Coding Guide ID	1995 Coding Guide Item Name/Description	1995 Coding Guide Format (as shown in Appendix E)	Clean Transition?	Transition Notes for Developer	Additional Notes
B.W.01	BW01	Year Built	N (4,0)	27	Year Built	4/N	Yes	Direct transition.	
B.W.02	BW02	Year Work Performed	N (4,0)	106	Year Reconstructed	4/N	Yes	Direct transition if > 0. Otherwise no value.	
B.W.03	BW03	Work Performed	AN (120)	106	Year Reconstructed	4/N	Partial	"RECONSTRUCTED" if > 0. Otherwise no value.	"RECONSTRUCTED is not an SNBI code for this item. Users may update this value at a later date.

B.W.01 – Year Built

Year Built		
Format N (4,0)	Frequency I	Item ID B.W.01

Specification	Commentary
Report the year in which original construction was completed and the bridge was able to carry traffic. For phased construction, report the year in which the first phase was completed and the bridge was able to carry traffic.	This date reflects the date when construction was completed, regardless of when the bridge was opened to traffic. Rehabilitation and/or widening of a bridge does not change the year built. If any portion of the bridge remains, the year built does not change. Provide a best estimate when the year built is unknown; do not assign a default value.

B.W.02 – Year Work Performed

Year Work Performed		
Format N (4,0)	Frequency I	Item ID B.W.02

Specification	Commentary
Report the year that work was completed on a bridge. For phased construction, report the year in which the first phase was completed and the bridge was able to carry traffic. This item is reported for each year regardless of whether work was completed on a bridge in that year.	This item identifies when work was completed to improve the functionality of a bridge, prevent deterioration from occurring, preserve a bridge, or restore the strength or performance of a bridge. Work performed should be identifiable by inspectors conducting an initial inspection following bridge replacement or rehabilitation. For other work types, information can be obtained from work tracking systems. When tracking systems are not readily accessible, estimate based on knowledge, observed changes and condition improvements since the previous inspection, applied stencils or stamps, wear, etc.

B.W.03 – Work Performed (1 of 4)

Work Performed		
Format AN (120)	Frequency I	Item ID B.W.03
Specification		
Report all work completed on the bridge in each year, using one or more of the codes shown in the work category tables below. Report multiple codes separated by pipe (|) delimiters. Report all types of work when improvement, rehabilitation, or preservation work categories were performed in combination (one or more work types from Table 30, 31, 32, and/or 33). Do not report bridge improvement or bridge preservation (Table 30, 32, or 33) when the work resulted from replacement of a bridge (including replacement of all culvert barrels), or replacement of the deck, superstructure, or substructure, (Table 29 or Table 31 replacement work types). Report only major rehabilitation when both major and minor rehabilitation were completed on the same component (e.g. the deck, superstructure, substructure, or culvert). Do not report routine maintenance or routine repair. Report 0 when no work is completed or when work is completed that does not correspond with the work included in the following work category tables.		

B.W.03 – Work Performed (2 of 4)

Table 29. Bridge replacement code.

Code	Description
BR1	Replaced

Table 30. Bridge improvement codes.

Code	Description
IP1	Widened
IP2	Raised
IP3	Strengthened by retrofit
IP4	Seismic retrofit

Table 31. Rehabilitation codes for deck, superstructure, substructure, and culvert.

Code				Description
Deck	Superstructure	Substructure	Culvert	
DK1	SP1	SB1		Replaced
DK2	SP2	SB2	CU2	Major Rehabilitation
DK3	SP3	SB3	CU3	Minor Rehabilitation

B.W.03 – Work Performed (3 of 4)

Table 32. Preservation codes for deck, superstructure, substructure, and culvert.

Code				Description
Deck	Superstructure	Substructure	Culvert	
DK4			CU4	Overlaid
DK5	SP5	SB5	CU5	Sealed
	SP6	SB6	CU6	Coating (New or Replaced)
	SP7	SB7	CU7	Coating (Preserved)

Table 33. Other preservation codes.

Code						Description
Bearings	Deck Joints	Bridge Railings or Transitions	Scour Counter-measures	Channel Protection	Channel	
BG1	JT1	RT1	SC1	CP1		Installed or Replaced
BG2	JT2	RT2	SC2	CP2		Repaired
					CH1	Condition Improved

B.W.03 – Work Performed (4 of 4)

- Two and half pages of commentary with examples in SNBI (pg.309 – pg.311)

Table 45. Work Data Sets for Bridge Number 15558X.

Item ID	Data Item	Value (1)	Value (2)	Value (3)
B.W.02	*Year Work Performed*	2015	2016	2017
B.W.03	*Work Performed*	SP6|DK1	DK4	0