



DATE: July 31, 2020
TO: Bridge Manual Users
FROM: DTSD – Bureau of Structures
SUBJECT: **July 2020 Bridge Manual Update**

BOS is making the move to AutoCAD from Microstation. With Microstation CONNECT Edition having a completely new interface to learn, we felt it was time to make the switch to the CADD platform utilized by Civil 3D. We hope to have our standard insert sheets converted by early 2021, but will keep the existing Microstation versions available for some period after that.

FYI: If you work in Microstation, Bentley is no longer supporting version SS10 as of January 1, 2021. (SS4 is currently not supported). CONNECT will be required for support.

The Bridge Manual revisions to text and standards are now complete and posted online for this six-month cycle. Please see the attached sheets for a list, with brief explanation, of the Text and Standards that were revised.

Of particular interest in this edition:

- **Chapter 2:** Updated guidance on assigning structure numbers and posted structure number request forms on the Structures website - [Maintenance & Inspection Section](#).
- **Chapter 36:** Added guidance on metal buried structure usage. Rigid reinforced concrete structures are still recommended over metal structures, especially for higher volume roadways.
- **Chapter 39:**
 - Standardized Plans: Updated Standard Design Truss designations, updated bid items, and provided several minor changes.
 - Added two examples: E39-1: Design of Foundation Cap Beam / Integral Barrier TL-5 Loading and E39-2: Design of Sign Bridge Concrete Column for Vehicle Impact
- **New Chapter 43 – Structures Asset Management: Maintenance Work:** In conjunction with Chapter 41, works to implement Chapter 42, with an emphasis on bridge maintenance actions most often performed through the annual Highway Maintenance Work Plan (HMWP).
- **Chapter 45:**
 - Added guidance on bridge ratings for Emergency Vehicles (EVs)
 - Removed Culvert Load Rating Summary Form
 - Updated Bridge Load Rating Summary Form
- **Standard 15.03:** Updated Note to include bid item “Pipe Underdrain Wrapped 6-inch” to clarify underdrain was not incidental to “Slope Paving Concrete”.

- **Standard 30.14:** Updated Anchor Rod Assembly Details. All contracts with a November 2020 letting or later shall use the new bid item “Anchor Assemblies Poles on Structures” (531.8990) per the 2021 Standard Specification. Bid item “Anchor Assemblies Light Poles on Structures” (657.6005) has been retired. Several inserts have been updated based on these changes.

Most other changes are fairly minor. Please use the example calculations with care (follow along in AASHTO). A vertical black bar in the left margin notes all text changes.

The user’s feedback regarding the Bridge Manual is important to us as that is where we get many ideas for corrections, clarification and new ideas for enhancement.

July 2020 Bridge Manual Text Update Summary

<u>Chapter</u>	<u>Page Number(s)</u>	<u>Change</u>
1	1	Updated Index for new Chapter 43
2	3	Updated Bureau of Structures Organizational Chart
	13	Updated guidance for Structure Number requests
	13-14	Updated C-Structure guidance (includes structural plate structures)
	14	Added L-Structures for High Mast Lighting Structures
	14	Moved R-Structures guidance from 14.1.1.1 to 2.5
	14	Added Pedestrian boardwalk guidance
5	5	Removed Expansion Device costs and reference Estimator and Bid Express, now that bid items are LF rather than LS.
	14-16	Added 2019 year end structure square foot costs. Removed 2014.
10	4	Updated subsurface investigation guidelines for Box Culverts and Box Culvert Extensions.
14	8	Moved R-Structure guidance from 14.1.1.1 to 2.5
19	38	Clarified haunch heights for section properties and weights
36	5	Removed "Aluminum box culvert are not permitted by the BOS"
	15,16,18, 26	Clarified design fill height measured from top of culvert to the surface of earth fill or top of roadway pavement.
	45-51	Changed Section 36.13 to "Other Buried Structures" and added guidance for metal buried structures.
	52	Changed Section 36.14 to "References" and added WHRP reference
	53	Moved Design Example from Section 36.14 to 36.15
37	2	Updated reference to include Article No. where information can be found
	3	Updated reference for STSP to include STSP item No.
	3	Updated old references to those that are current
	3	Updated reference to include Article No. where information can be found
	4	Italicized "AASHTO LRFD Bridge Design Specifications" in last paragraph
39	6	Corrected 4-Chord Truss DMS width from 9'-0"W to 19'-0"W
	8	Corrected sign area from 200 sq. ft. to 240 sq.ft.
	25	Added Section 39.7 Design Examples
39E-1	All	New Example - Design of Foundation Cap Beam / Integral Barrier TL-5 Loading

39E-2	All	New Example - Design of Sign Bridge Concrete Column for Vehicle Impact
40	13	Clarified the minimum age of deck is 28 days prior to TPO placement
	25-26	Added guidance on overlay transitions
43	All	New chapter
45	18-25,27-30,53,57-58,63-64,66,72	Added load rating and load posting guidance for Emergency Vehicles (EVs).
	20	Clarified in-service ratings for Service III limit state
	21	Updated Figure 45.3-1 (LRFR Flow Chart) for EVs
	23	Added row to Table 45.3-2 (LL Factors for Legal Loads) for EVs
	21	Updated Figure 45.3-2 (LFR and ASR Flow Chart) for EVs
	52	Removed Culvert Load Rating Summary Form (Exg. Figure 45.9-3)
	55	Updated Bridge Load Rating Summary Form (Figure 45.9-1)
	63	Added Figure 45.10-5 (Emergency Vehicle Load Models)
	66	Updated figure references (Figure 45.10-6 and Figure 45.10-7)
	66	Added Figure 45.10-8 (Emergency Vehicle Load Posting Signs)
72	Added two references for EVs	

July 2020 Standard Details Update Summary

Chapter 4

- Std 4.01 ■ No revisions.
- Std 4.02 ■ No revisions.
- Std 4.03 ■ No revisions.
- Std 4.04 ■ No revisions.
- Std 4.05 ■ No revisions.

Chapter 7

- Std 7.01 ■ No revisions.
- Std 7.02 ■ No revisions.
- Std 7.03 ■ No revisions.
- Std 7.04 ■ No revisions.
- Std 7.05 ■ No revisions.
- Std 7.06 ■ No revisions.
- Std 7.07 ■ No revisions.

Chapter 9

- Std 9.01 ■ Added Designer Note "See Standard 12.08 for guidance on underdrain placed above normal water. For underdrain exposed to high water, consider capping the upstream end to prevent clogging."
- Std 9.02 ■ No revisions.
- Std 9.03 ■ No revisions.

Chapter 11

- Std 11.01 ■ No revisions.

Chapter 12

- Std 12.01 ■ No revisions.
- Std 12.02 ■ No revisions.
- Std 12.03 ■ Updated footing steel shown in Front Elevation for clarity.
- Std 12.04 ■ No revisions.
- Std 12.07 ■ No revisions.
- Std 12.08 ■ Corrected Section A-A to show (9)-#5 bars at F.F.
 - Added Designer Note "For underdrain exposed to high water, consider capping the upstream end to prevent clogging."
- Std 12.09 ■ No revisions.
- Std 12.10 ■ No revisions.
- Std 12.11 ■ No revisions.
- Std 12.12 ■ No revisions.
- Std 12.13 ■ No revisions.

Chapter 13

- Std 13.01 ■ No revisions.
- Std 13.02 ■ No revisions.
- Std 13.03 ■ No revisions.
- Std 13.04 ■ No revisions.
- Std 13.05 ■ No revisions.
- Std 13.06 ■ No revisions.
- Std 13.07 ■ No revisions.
- Std 13.08 ■ No revisions.

- Std 13.09 ■ No revisions.
- Std 13.10 ■ No revisions.
- Std 13.11 ■ No revisions.

Chapter 14

- Std 14.02 ■ Updated coping dowel bar length from 1'-3" to 1'-10"
 - Updated coping dowel bar spacing from 2'-0" max. to 1'-4" max.
 - Updated coping transverse bar spacing from 1'-6" to 1'-4"
 - Updated coping transverse bar lap from 6" to 8"
 - Updated Designer Note for CIP Concrete Coping Detail
- Std 14.03 ■ No revisions.
- Std 14.04 ■ No revisions.
- Std 14.05 ■ No revisions.
- Std 14.11 ■ No revisions.
- Std 14.12 ■ No revisions.
- Std 14.13 ■ No revisions.

Chapter 15

- Std 15.01 ■ No revisions.
- Std 15.02 ■ No revisions.
- Std 15.03 ■ Updated Note to include "bid item Pipe underdrain wrapped 6-inch"

Chapter 17

- Std 17.01 ■ No revisions.
- Std 17.02 ■ No revisions.
- Std 17.03 ■ No revisions.

Chapter 18

- Std 18.01 ■ No revisions.
- Std 18.02 ■ No revisions.

Chapter 19

- Std 19.01 ■ No revisions.
- Std 19.02 ■ No revisions.
- Std 19.03 ■ No revisions.
- Std 19.04 ■ No revisions.
- Std 19.11 ■ No revisions.
- Std 19.12 ■ No revisions.
- Std 19.13 ■ No revisions.
- Std 19.14 ■ No revisions.
- Std 19.15 ■ No revisions.
- Std 19.16 ■ No revisions.
- Std 19.17 ■ No revisions.
- Std 19.18 ■ No revisions.
- Std 19.19 ■ No revisions.
- Std 19.20 ■ No revisions.
- Std 19.31 ■ No revisions.
- Std 19.32 ■ No revisions.
- Std 19.33 ■ No revisions.
- Std 19.34 ■ No revisions.
- Std 19.35 ■ No revisions.
- Std 19.36 ■ No revisions.

- Std 19.37 ■ No revisions.
- Std 19.38 ■ No revisions.
- Std 19.50 ■ No revisions.
- Std 19.51 ■ No revisions.
- Std 19.52 ■ No revisions.
- Std 19.53 ■ No revisions.
- Std 19.54 ■ No revisions.
- Std 19.55 ■ No revisions.
- Std 19.56 ■ No revisions.

Chapter 23

- Std 23.01 ■ No revisions.
- Std 23.02 ■ No revisions.
- Std 23.03 ■ No revisions.

Chapter 24

- Std 24.02 ■ No revisions.
- Std 24.03 ■ No revisions.
- Std 24.04 ■ No revisions.
- Std 24.06 ■ No revisions.
- Std 24.08 ■ No revisions.
- Std 24.09 ■ No revisions.
- Std 24.10 ■ No revisions.
- Std 24.11 ■ No revisions.
- Std 24.12 ■ No revisions.

Chapter 27

- Std 27.02 ■ No revisions.
- Std 27.05 ■ No revisions.
- Std 27.06 ■ No revisions.
- Std 27.07 ■ No revisions.
- Std 27.08 ■ No revisions.
- Std 27.09 ■ No revisions.
- Std 27.10 ■ No revisions.

Chapter 28

- Std 28.01 ■ Added note "Anchor plates shall be provided 3" from each side of the field splice"
- Std 28.02 ■ No revisions.
- Std 28.03 ■ No revisions.
- Std 28.04 ■ No revisions.
- Std 28.05 ■ No revisions.
- Std 28.06 ■ No revisions.
- Std 28.07 ■ No revisions.
- Std 28.08 ■ No revisions.

Chapter 29

- Std 29.01 ■ No revisions.
- Std 29.02 ■ No revisions.
- Std 29.03 ■ No revisions.

Chapter 30

- Std 30.02 ■ No revisions.

- Std 30.04 ■ No revisions.
- Std 30.05 ■ No revisions.
- Std 30.07 ■ No revisions.
- Std 30.08 ■ No revisions.
- Std 30.09 ■ No revisions.
- Std 30.10 ■ Corrected adhesive anchor note from 3/4" to No. 6 bar.
- Std 30.11 ■ Corrected adhesive anchor size from 5/8" DIA. to 1/2" DIA.
- Std 30.14 ■ Updated horizontal dimension for conduit entering junction box from 2" to 2 1/4"
 - Updated bid item name to "Anchor Assemblies Poles on Structures"
 - Updated anchor rod designation to ASTM A449
 - Updated anchor rod minimum bottom threads from 4" to 6"
 - Updated anchor rod template holes (Anchor Rod DIA. + 1/16")
- Std 30.15 ■ No revisions.
- Std 30.16 ■ Added note to advise on limitations of first post spac. measured from end post to meet requirements for back-up plate placement
- Std 30.17 ■ No revisions.
- Std 30.18 ■ No revisions.
- Std 30.19 ■ No revisions.
- Std 30.20 ■ No revisions.
- Std 30.21 ■ No revisions.
- Std 30.22 ■ No revisions.
- Std 30.24 ■ No revisions.
- Std 30.25 ■ No revisions.
- Std 30.26 ■ No revisions.
- Std 30.27 ■ No revisions.
- Std 30.28 ■ No revisions.
- Std 30.29 ■ No revisions.
- Std 30.30 ■ No revisions.
- Std 30.31 ■ No revisions.
- Std 30.32 ■ No revisions.
- Std 30.33 ■ No revisions.
- Std 30.34 ■ No revisions.
- Std 30.35 ■ No revisions.
- Std 30.36 ■ No revisions.
- Std 30.37 ■ No revisions.

Chapter 36

- Std 36.01 ■ Added "Fill Height" dim. to Section C1 and revised Design Data Fill Height Notes
 - Revised Fill Height Range Note in "Design Data"
- Std 36.02 ■ No revisions.
- Std 36.03 ■ Corrected "Top Bars for Top Slab" keyed note location
- Std 36.04 ■ No revisions.
- Std 36.05 ■ No revisions.
- Std 36.06 ■ No revisions.
- Std 36.07 ■ No revisions.
- Std 36.08 ■ No revisions.
- Std 36.10 ■ No revisions.
- Std 36.11 ■ No revisions.
- Std 36.12 ■ No revisions.
- Std 36.13 ■ No revisions.
- Std 36.14 ■ No revisions.
- Std 36.15 ■ No revisions.

Std 36.16 ■ No revisions.

Chapter 37

Std 37.01 ■ No revisions.

Std 37.02 ■ No revisions.

Chapter 38

Std 38.01 ■ No revisions.

Chapter 39

Std 39.02 ■ No revisions.

Std 39.03 ■ No revisions.

Std 39.09 ■ No revisions.

Std 39.10 ■ No revisions.

Std 39.11 ■ No revisions.

Std 39.12 ■ No revisions.

Std 39.13 ■ No revisions.

Chapter 40

Std 40.01 ■ No revisions.

Std 40.02 ■ No revisions.

Std 40.03 ■ No revisions.

Std 40.04 ■ No revisions.

Std 40.05 ■ No revisions.

Std 40.06 ■ No revisions.

Std 40.07 ■ No revisions.

Std 40.08 ■ No revisions.

Std 40.09 ■ No revisions.

Std 40.10 ■ No revisions.

Std 40.11 ■ No revisions.

Std 40.12 ■ No revisions.

Std 40.13 ■ No revisions.

Std 40.14 ■ No revisions.

Std 40.15 ■ No revisions.

Std 40.16 ■ No revisions.

Std 40.17 ■ No revisions.

Std 40.18 ■ No revisions.

Std 40.19 ■ No revisions.

Std 40.20 ■ No revisions.

Std 40.21 ■ No revisions.

Std 40.22 ■ No revisions.

Std 40.23 ■ No revisions.

Std 40.24 ■ No revisions.

Std 40.25 ■ No revisions.

Std 40.26 ■ No revisions.

Std 40.27 ■ No revisions.

Std 40.28 ■ No revisions.

Std 40.31 ■ No revisions.

Std 40.32 ■ Added "Section thru Abutment Transitional Area on Bridge"

■ Updated Designer Notes with profile transition note

Std 40.33 ■ No revisions.

Std 40.34 ■ Added "Section thru Abutment Transitional Area on Bridge"

- Added "Section thru Abutment"
- Updated Designer Notes with profile transition note
- Std 40.40 ■ No revisions.
- Std 40.41 ■ No revisions.