

Date & Time: Wednesday, March 28, 2018 (9:00 a.m.)

Location: SW Region Office, Dane and Rock Conference Room – Madison, WI

| ITEM | DATE | DESCRIPTION | STATUS | DUE DATE | BALL IN COURT |
|------|---------|---|--------|--|---------------|
| 1.14 | 3/21/16 | <p>Cast-In-Place Parapet Reinforcing Steel</p> <p>Industry has expressed concerns that vertical face parapet bar steel extending out of deck causes issues with paving equipment during the deck pour. This is also an issue at wing locations. <i>BOS is currently working on updated Standard parapet reinforcing steel detailing and will provide guidance through the next update to the Bridge Manual.</i></p> <p>2016-07-19: BOS has updated a number of Standard Details to address this issue. The new Standards show two separate vertical reinforcing bars similar to the sloped face parapet details. These details will not be published at this time because of impending MASH crash testing criteria verification, but will allow a field change to be made upon request</p> <p>2017-03: BOS is continuing to work on refining the detail to avoid any conflicts and also is still assessing the MASH crash testing criteria. BOS plans on updating the Standard with the July 2017 Standards updates. Contractors may request to use modified reinforcing steel details on a project via RFI for projects that do not show the two-bar system.</p> <p>2018-03: BOS staff have created updated details and are working to verify that the use of two vertical bars in lieu of one will not cause other issues with railing attachments, etc. The updated details are likely to be published with the July 2018 updates to the Bridge Manual and soon thereafter should start showing up in contract plans. However, there may still be some outstanding MASH implementation issues that cause a delay in publishing these updates to Standards. If contractors would like to use two vertical bars in lieu of one as is detailed in current contract plans, they can submit an RFI to the project team and BOS would approve that change.</p> | Open | 7/2016 7/2017 7/2018 | WisDOT |
| 1.15 | 3/21/16 | <p>Pedestrian Bridge Curb Pours</p> <p>Industry brought up concerns that certain project staff allow separate deck and curb pours on pedestrian bridges, and other staff do not. The workmanship and</p> | Closed | 11/2016 7/2017 | WisDOT |

efficiency are improved if two separate pours are allowed. WisDOT has historically had concern with water and deicing chemicals passing through the cold joint and negatively affecting the rate of corrosion of steel prefabricated truss members. *BOS will review this issue and determine whether alternatives can be presented to contractors for use in the field (i.e., monolithic pour vs. two pours and use of waterstop, etc.).*

2017-03: BOS has not worked on this issue since the last meeting due to the fact that very few pedestrian truss bridges are built each year. *BOS will review this issue and determine whether alternatives can be presented to contractors for use in the field.*

2018-03: Aaron Bonk stated that BOS still has concerns with placing a cold joint between the deck and curb due to the potential for chlorides and moisture to have access to the longitudinal stringers at the edge of deck (which are structural members on pedestrian truss bridges). If a contractor is awarded a prefabricated truss pedestrian bridge and wants to modify this detail, they can propose an alternative detail for review by BOS Design. BOS Design may be open to an alternative detail (waterstop, etc.) and will investigate if there is a way to insert language into the Standards to have designers allow monolithic or multiple pours with corrosion inhibiting elements.

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| 2.10 | 3/21/17 | Alternative Decking Systems for Prestressed Girder Bridges | Closed | 12/2017 | N/A |
|------|---------|--|--------|---------|-----|

BOS wants industry to provide information on alternative decking systems used on wide-flange prestressed girder bridges. It has come to BOS's attention that when tight girder spacings are utilized, the conventional Borg hanger systems are exchanged for an alternative system consisting of drilled in anchors into the sides of the wide-flanges, 2x members, and plywood spanning from girder bay to girder bay. Of specific note, BOS would like to know what necessitates this switch, what is the girder spacing where this exchange occurs, what bridges these alternative systems have been used on, what the long-term maintenance/durability has shown to date, etc.

2017-03-21: Use of alternate decking systems provide a significant cost savings to the department according to industry. This system was first used in Marinette approximately 10 years ago on a bridge built by Lunda. ZTI indicated that they use this detail anywhere they can.

The conventional Borg hanger system is not set up for 3" thick flanges – they can slip out and/or rotate. The alternate decking system carries less risk to the contractor. A demo was done with the alternative decking system on temporary bridges on the Marquette Interchange project. There was discussion in the demo to saw cut 6"-9" off of the top flanges during deck removals, and then remove concrete over the girder for the rest of the deck removal. Contractors raised the question of why the top flange is 4' wide. ZTI stated that a 7' girder spacing becomes a candidate for alternate decking systems and 12" clear spans or less cannot use conventional forming systems. The slope of decking also causes issues between girders with conventional forming systems. The material that is being used to fill the alternate decking system connection holes in the exterior of the top flanges could make a difference in the long-term performance of the girders. Industry stated that the Borg hanger system also requires holes to be filled and the wedge shape at the bottom of the top flange still could be susceptible to spalling. *ZTI indicated that they can send a list of bridges that have used alternate decking systems. Kraemer indicated that they haven't use alternate decking systems to date. BOS will follow up with Lunda to see if they are able to provide a list of bridges where alternate decking systems have been used. Once a list of bridges has been compiled based on industry feedback, BOS will review the existing bridges and make a determination of whether alternate decking systems will continue to be allowed based on the long-term maintenance viability of the system.*

2017-07-18: ZTI and Lunda provided example bridges that have used alternative decking systems for BOS review. BOS has subsequently reviewed the inspection reports for these example bridges and have held preliminary conversations with the Region Bridge Maintenance engineers related to the holes in the girder flanges. *BOS will be leading a discussion on this topic at the BOS Annual Bridge Maintenance Meeting in November, after which a final determination on the acceptability of these systems will be made and relayed to the contractors.*

2018-03-28: Aaron Bonk stated that through reviews of bridges and their respective inspection reports, BOS has not identified specific problems or issues with the alternate forming systems. At this time, BOS will not be prohibiting the alternative systems from use but BOS

reserves the right to review this situation in the future if specific issues are identified.

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| 2.13 | 3/21/17 | Filler/Cork Material Under Girders | Open | 1/2018 7/2018 | WisDOT |
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BOS would like to get more information from industry on what materials are being utilized for the '3/4" PREFORMED FILLER' that is shown to be placed on top of substructures and below the bottom flanges of girders. In some rare instances, specifically where the grade is steep, field engineers have noticed that the material isn't compressing and the girders end up bearing on the filler material instead of on the 1/2" elastomeric bearing pads. Potential options may include reducing the thickness of the filler material or changing the material type.

2017-03-21: ZTI indicated that they use a felt under girders and cork on retaining walls. They also asked why is it needed at all? More of an issue with partially poured diaphragms where the felt doesn't have enough weight on it, girder may actually bear. Some inspectors ask the contractor to seal the joint with mono, others won't allow the contractor to seal the joint. WisDOT would want whatever is used to remain in place and not hold water (for example, an open celled foam that the water would run out of, not a closed cell foam). *BOS will review the current Standard detailing practice and material requirements, and will update Standards and specs to improve performance at this location in the field.*

2018-03-28: At the November 29, 2017 Bridge Tech Committee Meeting it was decided that BOS would be revising our Standard Details (and subsequently contract plans) to utilize 1/2" preformed filler in lieu of 3/4". BOS staff reviewed the changes required based on this intent and was unable to get all of the changes incorporated into the January 2018 updates. These updates will be finalized with the July 2018 updates to the Bridge Manual.

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| 2.17 | 3/21/17 | Precast Structural Approach Slabs | Open | 1/2018 7/2018 | WisDOT |
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BOS inquired with industry on what concerns or impediments are present to industry which limit/hold back the use of precast structural approach slabs.

2017-03-21: Industry indicated that one issue discussed was the Z-bar protruding from the back of the abutment. The contractors asked what the purpose of the Z-bar is. Additionally, contractors asked I sleeper slab cure time is

an issue. David Stanke (ZTI) believes that it would be better to spend more time figuring out how to pour the structural approach slab integral with the bridge deck. Contractors also wondered if standard spec language/details have been cleaned up to not require a 14 day wet cure on abutment diaphragms and whether sleeper slabs need to be HPC or not. BOS commented that designers include a note on our plans (and this is also noted in the Standard for structural approach slabs) that the structural approach slab footing is not required to be HPC. *BOS will review whether the specs have been fully updated to remove the wet cure limitation on these elements.*

2018-03-28: Aaron Bonk inquired with the contractors to see if they were still having issues with construction staff not allowing diaphragm forms to be stripped prior to the 14-day wet cure on HPC structures. Industry indicated that there are still some issues on certain projects related to this. BOS will work to add language to the superstructure Standards related to curing requirements for the diaphragms.

3.10 3/28/18 Jacking Loads on Structure Plans Open 7/2018 WisDOT

David Stanke inquired about bridge design engineers including jacking loads on plans requiring jacking. It has been BOS's stance that there are many variables that are controlled by the means and methods of jacking which preclude designers from placing accurate loads on the plans. David Stanke stated that industry is only looking to get service dead loads (and potentially live loads in the event that jacking is required to be done under traffic) from designers. Dave Kiekbusch stated that in a survey of other North Central States, 6 of the 7 states stated that they provide loads. BOS will review this issue, will consider adding loads on the plans, and if it is decided to go this route a policy item will be added to the Bridge Manual.

3.11 3/28/18 Uniform Spacing of Rebar in CIP Retaining Walls Open 7/2018 WisDOT

Brent Freeman (Kraemer NA) inquired about trying to maintain consistent horizontal spacing through the length of CIP walls except for at the end panels, if possible. Brent stated that this will save time and labor by creating a more productive form, pour, and strip process. Additionally, Brent would like to see consistent footing step heights or slopes where possible. On walls with formliners, 18" steps would be best as that is the

typical height of formliner panels. Aaron Bonk stated that CIP cantilever retaining walls are fairly uncommon on WisDOT projects and that when they do occur, the designer should be working to optimize the design for both material savings and labor efficiencies. BOS will look to add guidance to designers in the Bridge Manual and/or Standards. Brent will send retaining wall numbers to BOS staff to review the plans to get a better feel for the variations currently in plans.

3.12 3/28/18 Railing Post Base Plate Dimensions Open 7/2018 WisDOT

Brent Freeman (Kraemer NA) inquired about looking at resizing railing post base plate dimensions to not have anchors lined up below the horizontal railing elements. Adhesive anchors are most commonly used in the field and the current post base plate layouts require the railing to be positioned, anchor holes marked, railing removed, anchor holes drilled and anchors installed, reset railing, and tighten bolts. If the base plates were resized, the setting/removing/resetting of railing could be condensed to one setting. Aaron Bonk stated that BOS Development has been reviewing the anchor bolt hole locations/parapet steel locations over the last year, and will continue to do so with the new MASH criteria. Additionally, Aaron Bonk stated that BOS does not want industry drilling directly through the base plate holes because the paint and galvanizing inevitably will be damaged in that process. BOS will continue to review/update base plate designs and will try to determine if an alternative can be developed to not require the resetting process yet doesn't have the risk of damage to the paint/galvanizing.

3.13 3/28/18 Bridge Deck Reinforcing Steel Clearances Open 7/2018 WisDOT

Krissy Van Hout received feedback from industry related to tight spacing of deck reinforcing steel. BOS opened up this topic for discussion to see if this issue is common on bridge projects with continuity reinforcement over the piers or if some cases are worse than others. Industry stated that this issue is not prevalent on bridge deck pours. David Stanke indicated that at times, the pours for 56" single slope barriers become difficult due to the small width at the top of the forms. BOS will review the Chapter 17 Standards and determine if additional design guidance is necessary for the layout of continuity reinforcing steel by designers.

3.14 3/28/18 Contractor Use of 3D Models Closed

Aaron Bonk inquired with industry on how they are utilizing 3D in their current processes of fabrication and construction. Aaron Bonk and others from BOS also provided background on the intent of BOS's BIM team, upcoming pilot projects, and long-term view of how 3D models can/will be used in the future. The open discussion included concerns from industry (how do contractors pass models/plans to their subcontractors, liability concerns of passing models, etc.), what industry is doing currently (3D models for specialty forms and formwork, 3D models for pile driving through other structures, etc.).

3.15 3/28/18 Additional Discussion Items

David Stanke inquired about temporary barrier standard details and requirements for pinning on bridge decks and on roadways. Aaron Bonk and Laura Shadewald stated that recent conversations have come up, but the current understanding from BPD is that the details have not changed. The intent of requiring pinning in certain cases is to reduce risk/increase safety for the travelling public and also the workers in the work zone. Aaron Bonk will follow up on this issue and will provide more of a history of the detail.

David Stanke (and Brent Freeman and Dan Kowalski agreed) stated that the double standard' involved with OCIP vs. non-OCIP projects related to bridge demolitions is not acceptable. An open discussion on the topic ensued. Aaron Bonk will follow up with BPD and BTO on this topic.



AGENDA

Bridge Tech Committee – Design & Construction Subcommittee Meeting

2018-03-28

9:00 AM – 11:30 AM

SW Region Office – Dane & Rock Conf Room

Agenda topics

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| • Introductions | All |
| • Action Item Review from Previous Meetings | Bonk |
| • Vertical Parapet Reinforcing Steel, Pedestrian Bridge Curbs, Alternative Decking Systems, Filler Under Girders, Approach Slabs | |
| • Jacking Loads on Structure Plans | Stanke |
| • Uniform Spacing of Rebar in CIP Retaining Walls | Freeman |
| • Railing Post Base Plate/Anchorage Locations | Freeman |
| • Bridge Deck Reinforcing Steel Clearances | Bonk |
| • Contractor Use of 3D Models | Bonk |
| • New Action Item Review | Bonk |

Bridge Technical Committee Structures Design & Construction Subcommittee

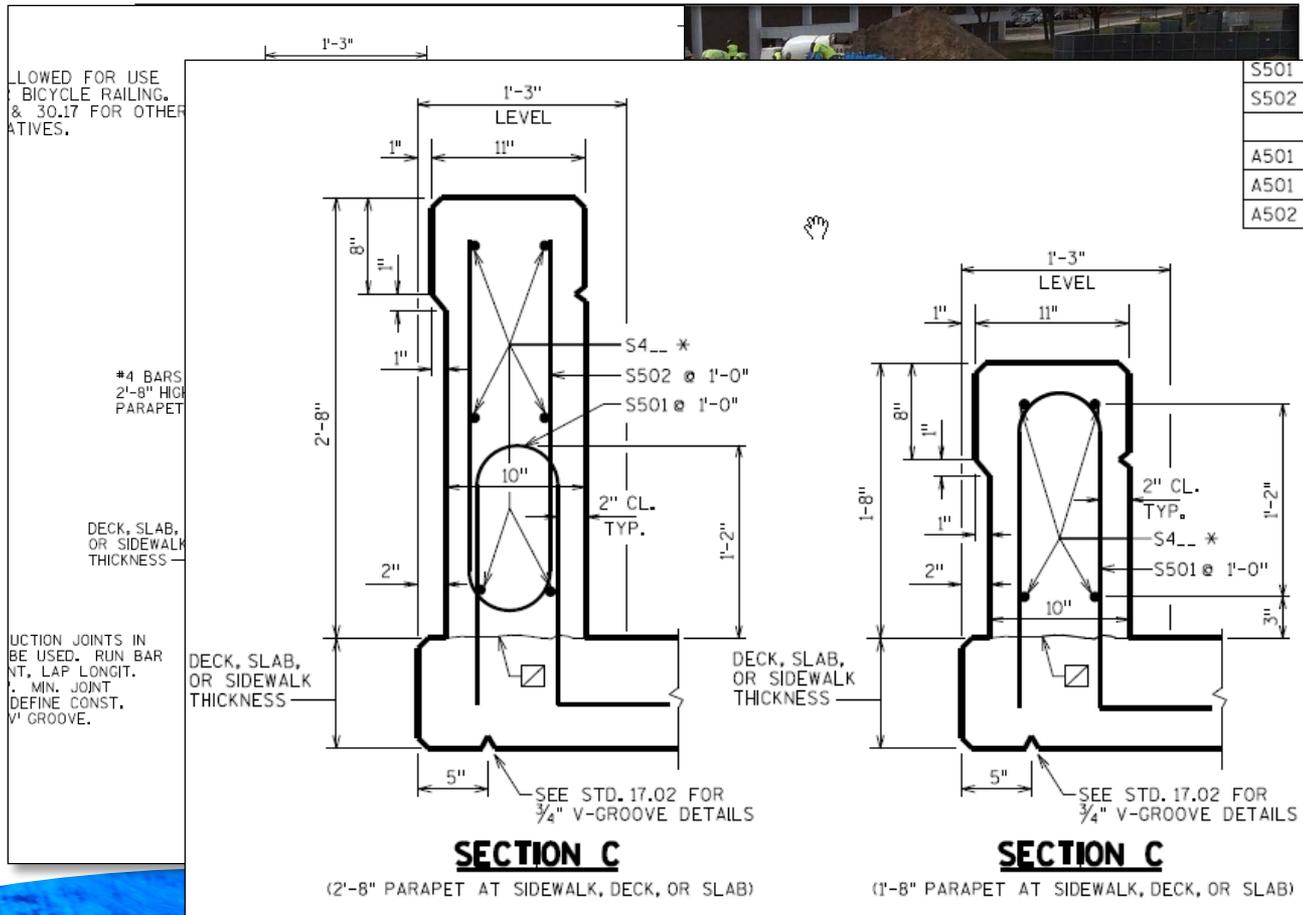
March 28, 2018

Agenda

- ▶ Introductions
- ▶ Action Item Review from Previous Meetings
- ▶ Jacking Loads on Structure Plans
- ▶ Uniform Spacing of Rebar in CIP Retaining Walls
- ▶ Railing Post Base Plate/Anchorage Locations
- ▶ Bridge Deck Reinforcing Steel Clearances
- ▶ Contractor Use of 3D Models
- ▶ New Action Item Review

Action Item Review

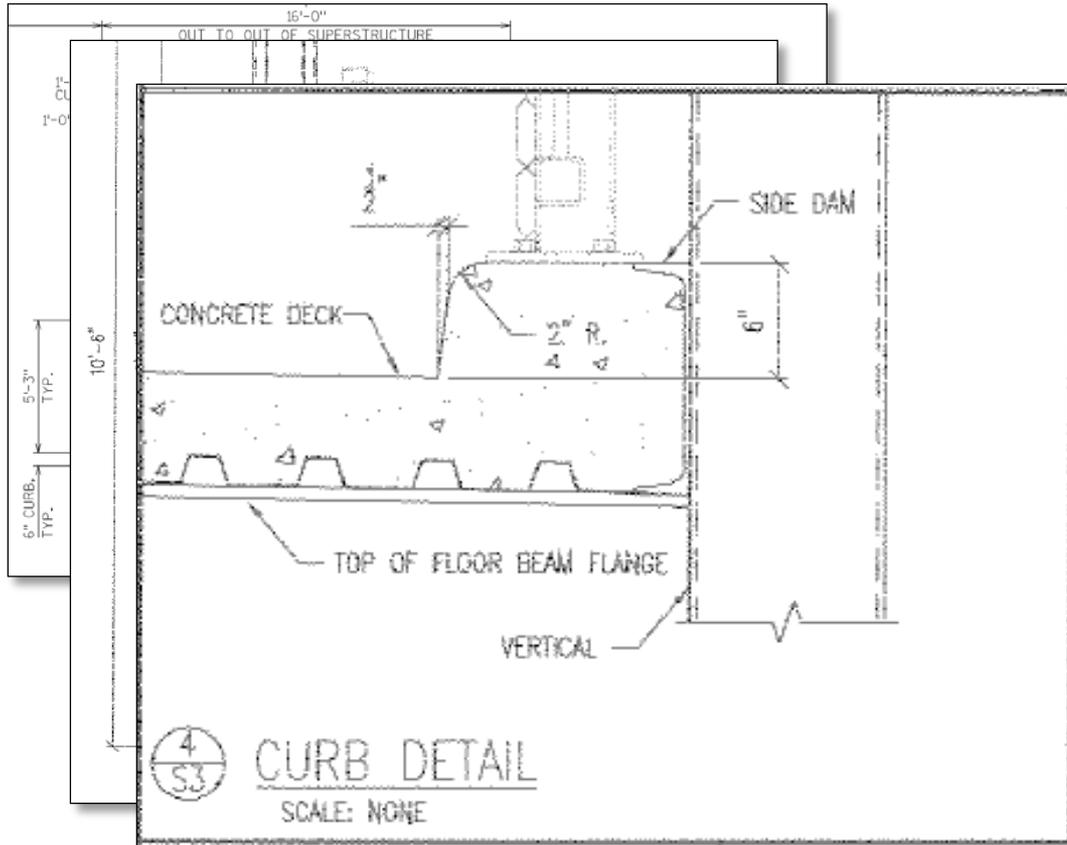
► Cast-In-Place Vertical Parapet Reinforcing Steel



Standards to be updated to change to two vertical bars in July 2018

Action Item Review

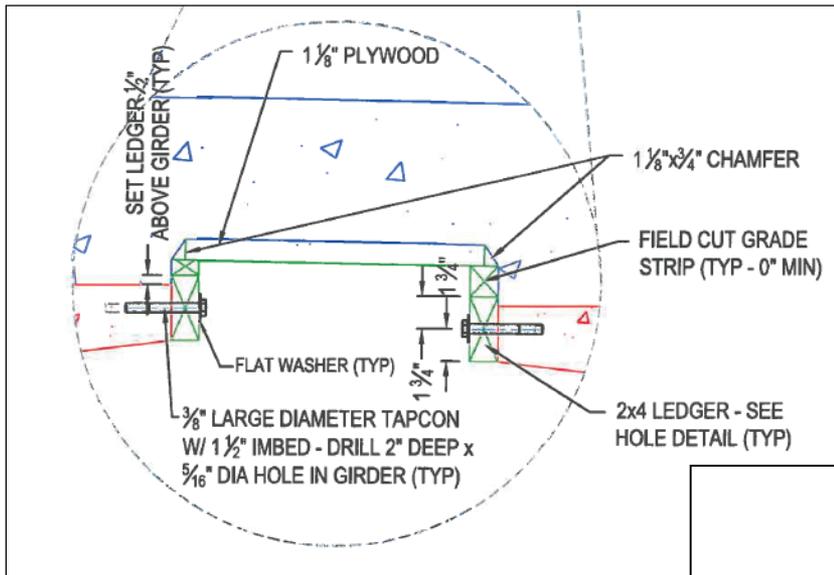
▶ Pedestrian Bridge Curb Pours



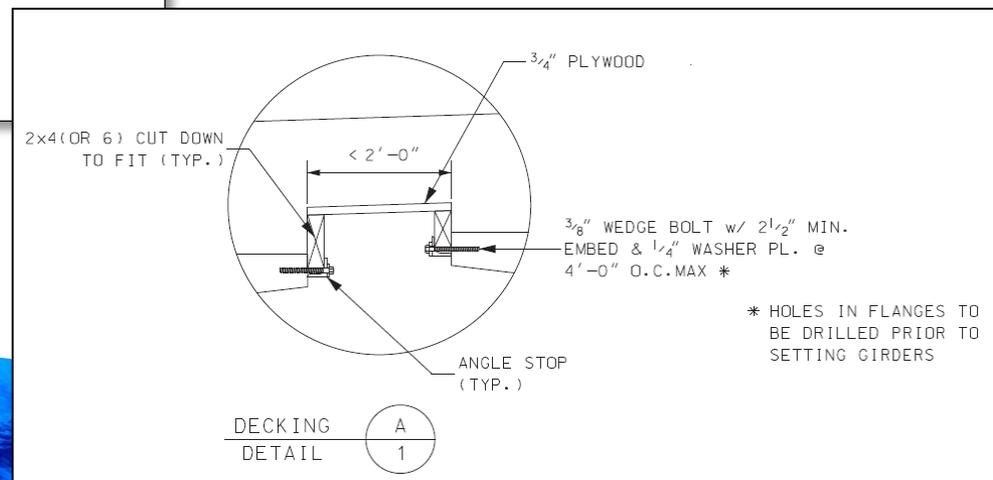
Contractor to propose modifications to curb pours for review by BOS Design after prefabricated truss pedestrian bridge projects have been awarded

Action Item Review

▶ Alternative Decking Systems for Prestressed Girder Bridges

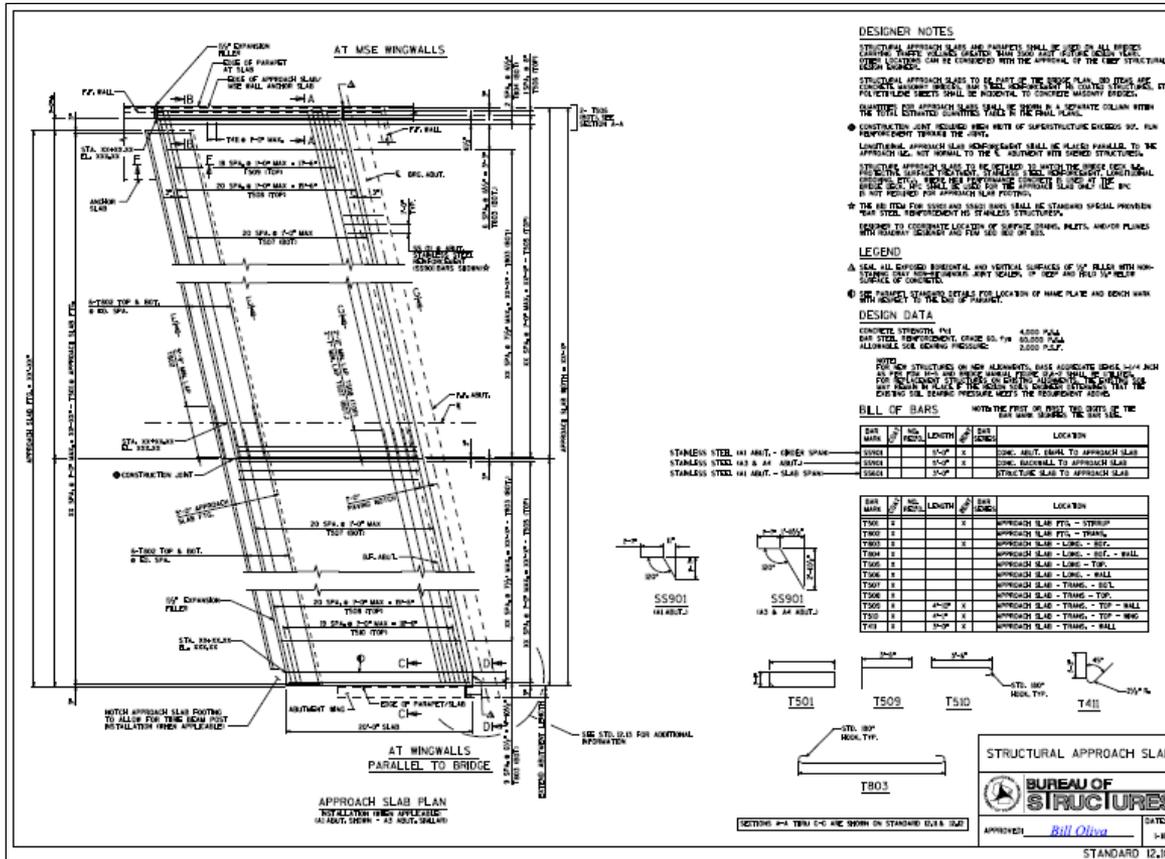


Details similar to those shown below will be allowed for use, but may be revisited if issues are found in the future



Action Item Review

► Precast Structural Approach Slabs



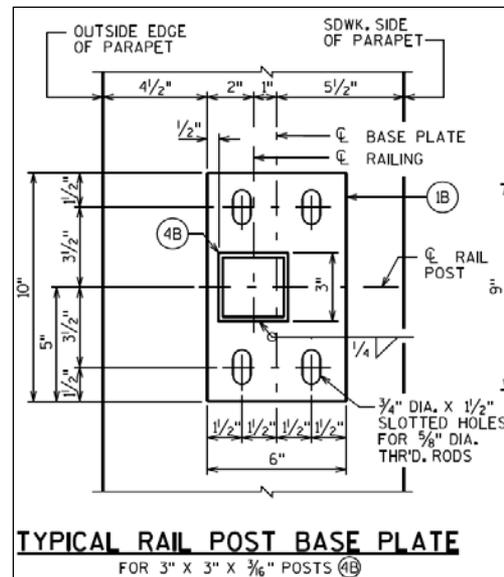
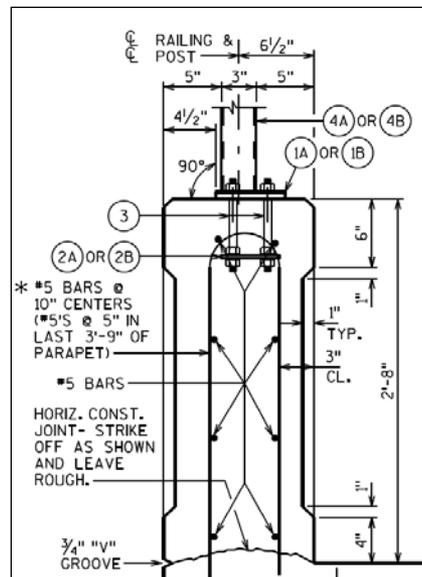
Contractor issues remaining related to wet cure requirements, timelines for stripping forms, etc.?

Jacking Loads on Structure Plans

- ▶ Should loads be included on plans or not?
 - BOS main concern with providing loads:
 - Not knowing the exact contractor work plan and timing of jacking operations related to other construction activities
 - Industry Input...

Railing Post Base Plate Dimensions

- ▶ Industry practice is to use adhesive anchors – current details have anchors vertically under horizontal rail members requiring the railing to be removed for drilling



Previous reviews of this issue by BOS...

Bridge Deck Reinforcing Steel Clearances

- ▶ BOS has received concerns from the field related to concrete pours not being able to get through top mat of deck steel...
- ▶ Industry input...
 - Is this a consistent issue?
 - If so, is there a minimum spacing contractors would prefer to see (above the minimum of the max aggregate size)?
 - Is this only in certain cases? On certain structure types?

Contractor Use of 3D Models

- ▶ BOS working towards piloting a few bridge and sign structure 3D projects
- ▶ Industry input...
 - What are you already doing?
 - 3D fabrication?
 - Model use on work in other states (Michigan and Iowa are already using 3D models/project delivery)?
 - Interested in being a part of a workshop?

Review of New Action Items