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Structures Engineering Instructions (SEI)

Distribution: Structures, Bureau Chiefs, Chief of Contract Admin., Consultants

Approved: _____ **Date:** 4/10/2017

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Structures Program Manager

Subject: **Integral Abutment – Backwall Cracking Mitigation**

Administrative Information:

Effective Date: This SEI shall be considered effective for the Structures Section from the date of approval.

Superseded SEI: None.

Exceptions: None.

Disposition of SEI Content: The technical information transmitted by this SEI will be incorporated into the next revision of the Structures Design Manual.

Purpose:

Significant cracking has been observed in the backwall of numerous integral abutment bridges. Cracking in this location may cause long-term durability problems caused by corrosion from chloride intrusion. The attached photos illustrate the cracks and the water propagating through them.

To provide guidance to Structures Section Engineers on the requirements to mitigate vertical cracking between integral abutment beams.

Technical Information:

AASHTO C5.7.6.3.4

Crack width is inherently subject to wide scatter, even in careful laboratory work, and is influenced by shrinkage and other time-dependent effects. Steps should be taken in detailing of the reinforcement to control cracking. From the standpoint of appearance, many fine cracks are preferable to a few wide cracks. Improved crack control is obtained when the steel reinforcement is well distributed over the zone of maximum concrete tension. Several bars at moderate spacing are more effective in controlling cracking than one or two larger bars of equivalent area.

The required crack width is directly proportional to the exposure factor, therefore, if the individual Authority with jurisdiction desires an alternate crack width the exposure factor can be adjusted directly. For example an exposure factor of 0.5 will result in an approximate crack width of 0.0085 in.

To take precautionary measures pending further research, the minimum spacing of horizontal reinforcing on the near face of integral abutment backwalls shall be no greater than 6". Further precautions can be taken that include waterproofing the far face of the backwall, and using a reduced exposure factor while determining crack width.

Reference Integral bridge end detail figures 2.5.2.1-1, and 5.7.1-3.

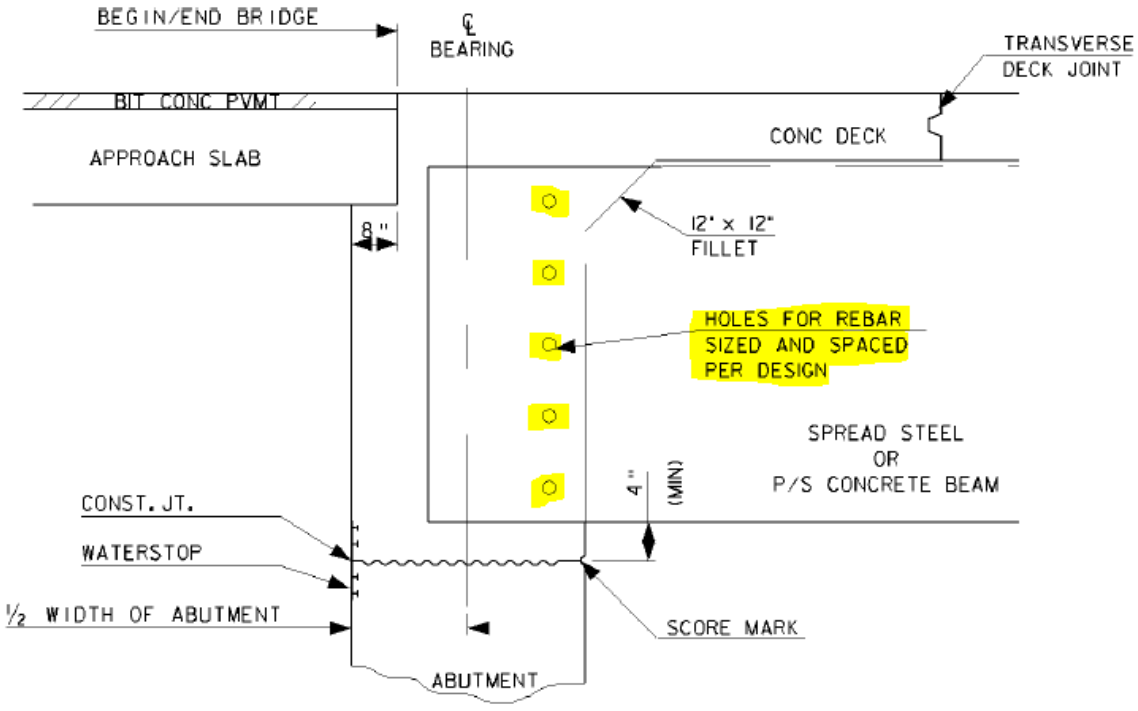

Figure 2.5.2.1 -1 Type A – Bridge Ends for Integral Abutment Bridges with Approach Slabs.

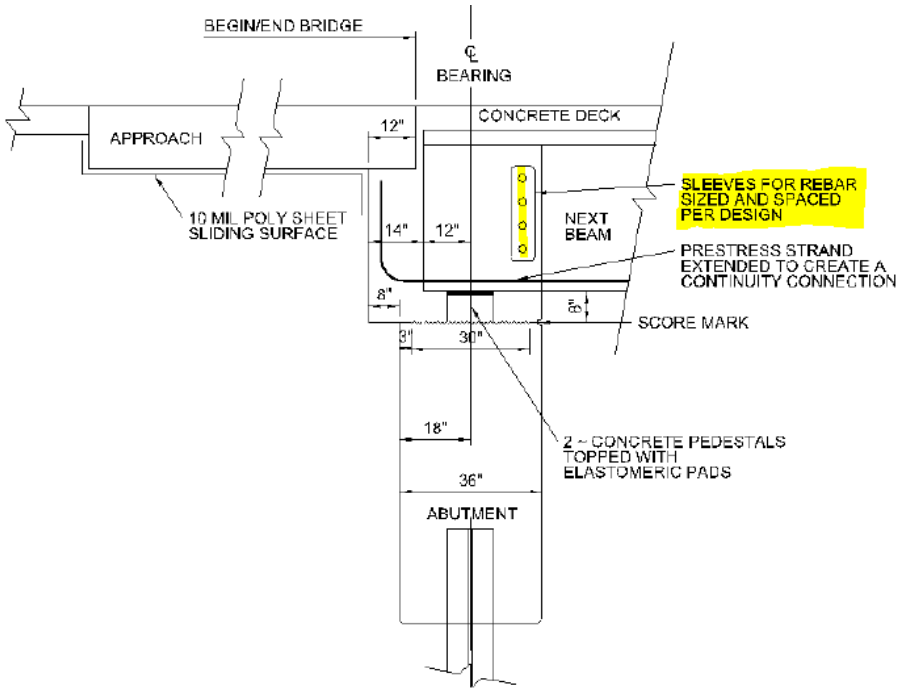

Figure 5.7.1 -3 North East Extreme Tee (NEXT) Type A Bridge End Detail

Vertical cracking between integral abutment beams above bridge seat

Vertical cracking between integral abutment beams above bridge seat

Implementation:

The content of this SEI will implemented immediately on all integral abutment projects that have not progressed to the Contract Plan phase.

Transmitted Materials:

No supplemental materials are transmitted with this SEI.