Bridge Design Memorandum

To: Bridge Design

From: NJA/els

Date: 2/11/2014

Re: Intermediate Diaphragms for Prestressed Concrete Beam Spans

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As per NJA and JMW, for prestressed concrete beam spans less than 150 feet (referring to beam bearing to bearing length even if part of a continuous span group) the beams may be detailed and thus designed having no permanent 9 inch intermediate diaphragms (the diaphragms out in the span), unless otherwise specified by the *AASHTO LRFD Bridge Design Specifications*.

Note that this does not apply to the 1'-0" diaphragms at the interior bents of a continuous span unit which are sometimes referred to as "continuity diaphragms" (but the plans often have them called out as *1'-0" Int. Diaphragms*).

In the case of bridge widening or repair projects, the new beams are to be designed and detailed with diaphragms that match up with the existing conditions of the bridge.

The reasons for this allowance to not include intermediate diaphragms on such prestressed concrete beam spans are as follows:

(1) No Longer Required by the Specifications

(a) The AASHTO Standard Bridge Design Specifications used to require intermediate diaphragms on prestressed concrete girder spans as often as every 40 feet.

(b) The *AASHTO LRFD Bridge Design Specifications* do not have such a requirement.

(2) Economy of Construction

(a) The permanent concrete intermediate diaphragms tend to be some of the most time-consuming and costly portions of the cast-in-place concrete to construct on a prestressed girder bridge.

(3) Less Complexity in Detailing Plans

(4) Lack of Consensus on Structural Design Need/Basis

(a) Although one of the more common defenses for using permanent intermediate diaphragms for prestressed concrete spans is for minimizing damage due to over-height vehicle collisions, more and more research suggests that the only way this is shown to significantly minimize structural damage in such cases is if the point of impact is almost directly in-line with these diaphragms.

(b) Fewer states are requiring permanent intermediate diaphragms for prestressed concrete girder spans.

It is also noted the Contractor will still be responsible for the stability of the bridge girders during erection and construction up through the bridge deck reaching full design strength. This will include some sort of temporary bracing submittal prepared by a registered professional engineer and to subject to review by Bridge Division prior to the superstructure work commencing.