Policy Number MR 23-01

POLICY FOR INSTALLATION OF DOWELS IN OUTSIDE SURFACED SHOULDERS FOR I80 WEST OF LINCOLN

Nebraska Department of Transportation

Pavement Design – Policy Letter

Policy Number: MR 23-01

Approval Date: 3/13/23 By: Materials & Research Engineer

Approval Date: 3/14/23 By: Deputy Director

Pavement Design Manual Chapter affected by this policy Letter:

Chapter Two: Pavement Design Overview

POLICY FOR INSTALLATION OF DOWELS IN OUTSIDE SURFACED SHOULDERS FOR I80 LINCOLN TO GRAND ISLAND

Background

I80 West of Lincoln has sufficient capacity to warrant a third lane of traffic in each direction. The level of service (LOS) is expected to decrease to the point that a fourth lane will be needed in the future between the year 2039 and 2062. If that occurs, then the need for using dowel bars in the outside shoulder should be evaluated.

Dowel bars provide load transfer between portland cement concrete (PCC) panels at the transverse joint. This reduces stress by sharing the load with the adjacent panel and minimizes distresses such as faulting, pumping and corner breakage. Outside PCC shoulders are not typically doweled unless they are expected to have traffic in the future. On I80 rumble strips are installed in concrete shoulders outside the traveled way. Rumble strips would need to be covered, milled, or filled-in to accommodate long term traffic.

Purpose

The purpose of this policy is to establish a guideline for the use or exclusion of dowel bars in portland cement concrete shoulders on I80 from Lincoln to Grand Island.

Policy

The Nebraska Department of Transportation (NDOT) has determined using Mechanistic Empirical (ME) Pavement Design that dowel bars are warranted in outside PCC shoulders.

Outside PCC shoulders were evaluated assuming little or no truck traffic used the shoulders for the first 15 years of service. After the 15th year it was assumed that the mainline and shoulders were diamond ground to remove rumble strips and improve ride quality. On the 16th year it was assumed that 65% of the trucks used the outside driving lane, formerly the outside shoulder. AASHTOWare ME Design output showed that there was reduced pavement distress when the PCC was doweled. As a result of this analysis, it was determined that the additional expense of adding dowel bars in outside PCC shoulders during initial construction is warranted.