

# MnPAVE Assignment

**Project No:** 100-1000

**Location:** MnDOT District 2, Roseau County, Warroad

**Route:** Minnesota Highway 11 (MN 11) from County State Aid Highway (CSAH) 75 to CSAH 74, Reference posts 91.670 to 92.671

**Letting Date:** 3/18/2022

**Designer:** You

**Coordinates:** 48° 55' North Latitude, 95° 20' West Longitude

**Construction Type:** BAB (Bituminous over Aggregate Base)

**Traffic Forecast:** 2.515 million ESALs for a Design Life of 20 years (1.1% annual growth rate)



## Structure:

- ? Hot-Mix Asphalt (HMA), PG58-34 binder (get traffic speed from map)
- ? Aggregate Base: MnDOT Class 5
- 15 in. Aggregate Subbase: MnDOT Select Granular
- 12 in. Engineered Soil: Loamy Sand
- Undisturbed Soil: Loamy Sand

Minimum HMA thickness = 4.0 in.

Minimum Class 6 thickness = 6.0 in.

Width of both layers is 36 ft. (one lane in each direction with a shared center turn lane)

Unit weight of both HMA and Class 6 is 145 pcf.

HMA thickness is adjusted in increments of 0.5 in.

Base thickness is adjusted in increments of 1.0 in.

Use the **2020 Average Bid Prices for Awarded Projects** sheet to determine the price per ton for HMA Wearing Course Mix (Item No. 2360509/23300) and price per cubic yard for Class 5 (Item No. 2211507/00170).

Find design thickness values for the first two layers that:

1. Meet the reliability requirements shown on MnPAVE's Output page and
2. Minimize the cost per mile.
3. In some cases, a thick base beneath a 4" HMA layer triggers a thickness warning while a thinner base does not. This is because the stress was already near the warning threshold. A 6" base over a less-stiff subbase will have greater deflection and less stress than a 12" base. The addition of more base material, which is stiffer than the subbase, decreases the deflection and increases the stress in that layer. The stress warning can be ignored for this assignment. Click "Close" instead of "Adjust Layer 1 Thickness".

**Turn in a printout of the pdf MnPAVE report with the combined cost per mile of the top two layers typed in the *Notes* section.**

(go back to **Project Information** to type this in before creating the pdf)