Case Study

Background
Near the completion of construction, which including a sub cut, imported fill, dense grade aggregate and asphalt base course, significant deformation and rutting over a portion of the roadway surface began to occur. Movement could be seen and felt underfoot of what had been stable just a few days earlier. Exploratory excavation revealed pockets of perched water just a few inches below the original excavation. The problem developed only after the placement of the asphalt base course, an impermeable layer. Prior to that, water vapor migrating upward through the section would evaporate upon nearing the surface. With the introduction of the impermeable asphalt, the water vapor began to accumulate in the structural layers, soon saturating and greatly weakening the section.

Solution
Perforated pipes trenched into the structural layer failed to adequately remove the moisture leading to full reconstruction of the affected section. The engineer determined a capillary break was needed to eliminate the upward migration and accumulation of water and water vapor. Total coverage of the road section would be necessary. GSE RoaDrain was selected over a traditional geotextile wrapped coarse aggregate system as it was more economical and would minimize further delay.

After removal of the asphalt wearing course and base material, the subgrade was leveled and smoothed. A perforated pipe was added at the low point of the project and the RoaDrain was installed to accommodate flow to the new pipe.

Representatives from both the manufacturer and distributor of the RoaDrain were present to assist the construction crews with proper placement and installation. The county engineer as well as a representatives from the Minnesota Department of Transportation were also present.
GSE RoaDrain Provides a Capillary Break

Water can rise into untreated aggregate courses from underlying ground water either in liquid form under capillary forces or as water vapor. Water entering the pavement structure in either forms will usually rise until reaching an impervious layer where, unless drained away, it will accumulate. A Capillary Break prevents the upward migration of liquid water or water vapor into the structural base layers. RoaDrain’s triplanar structure provides sufficient void to breaks the capillary path. This stops the upward migration of liquid water and allows evaporation of water vapor, preventing either form accumulating in the structural base layers.

Project Update 2012

After 12 years of service, the section with the RoaDrain rides much like it did when first constructed. In 2006, Steele County embarked on the reconstruction and realignment of this road starting at the end of this project and going east. RoaDrain became the "go to" solution as more troublesome areas were exposed.