**Warnerville Road Rehabilitation – FDR w/ LithTec**

Stanislaus County Public Works

With a new funding source of Senate Bill 1 gas tax funds becoming available in 2017, the County’s Public Works team began brainstorming on long term, sustainable and innovative solutions to resolve the historically poor road conditions on the eastern portion of Warnerville Road. The targeted segment of Warnerville Road is located in eastern rural Stanislaus County and was made up of stretches of asphalt pavement, gravel, and native non-draining soils. This 5.4 mile segment of road is primarily utilized as an agricultural haul road for various agricultural products such as tree nuts and wine grapes. During harvest periods, the roads sees heavy truck loads for a short duration of time. Other times of the year, there is little to no traffic on this road. The paved areas on this road were breaking up and experiencing base failure, while the non-paved areas were rutting badly due to heavy loading and poor soils (R values ranging from 6 to 26). From a maintenance perspective, it was becoming a nightmare; lots of effort and money for a road with an ADT of less than 100 cars a day. We needed a long-term solution!

Possible solutions that were considered ranged from performing grading and compaction on an annual basis, spray down dust control/stabilization products with a chip seal or asphalt concrete overlay, to full depth reclamation (FDR) using a variety of different additive binding agents. In order to properly stabilize the existing road to meet the long-term loading demand, it was going to be necessary to FDR the road bed. Stanislaus County is no stranger to utilizing FDR as a pavement rehabilitation solution, as we have completed numerous projects of this type over the last 5-10 years. Not so fast! One undesirable site condition challenged us on our stabilization strategy. The native underlying soils that make up Warnerville Road, contain large cobbles (4”-6”) starting at depth of about 12”. Therefore, stabilizing the grade any deeper than 12” would have been problematic and outright unfeasible for the stabilizing equipment. Utilizing cement in the mix design, we were going to need to stabilize down to 18” to even meet a minimum TI of 8. Not a viable solution. This road TI was probably higher than an 8, but we all knew we would have to settle for something less, given the site conditions and the restrictions with the stabilizing equipment. Now what?

In comes Lithified Technologies. They are the producers of a product called LithTec. It’s an additive not unlike cement, that you mix into the road grade just as you would in a standard FDR process. However, the advantage in utilizing this product is that in lab testing, it proved to produce a much stronger base than a traditional cemented base, and therefore we could stabilize Warnerville to a much shallower depth, while still exceeding the strength required to reach a minimum TI of 8. The LithTec additive essentially turns road materials into a stone-like structure within 24 hours. Another major advantage of the LithTec additive is that it is supposed to be 100% impermeable to water. We felt we found our solution to Warnerville Road. Stabilize the grade to roughly 10” to stay clear of the cobbles and get a very strong/rigid base that would stay dry and withstand truck loading. On top of all this, the base strength would be so strong that we would not need to add an asphalt concrete overlay for the wearing course and as added structural section strength. We could literally put a chip seal on it and drive right on it. Well, that’s what we did! Instead of hauling in 11,000 tons of asphalt, we hauled in 1,700 tons of chips for chip seal. That’s a huge Greenhouse Gas and air quality benefit benefit!

The final design and installed pavement rehabilitation solution included an FDR with the LithTec additive to a depth of 10”. We then placed a double chip seal on the surface (1/2” chip w/ a 3/8” chip top layer) and performed final pavement striping. The County accomplished it’s goal in finding a sustainable and long term solution to the rural Warnerville Road. Without the LithTec additive product, stabilizing the grade on this road would not have been possible and we would have been faced with a very expensive continued regular maintenance efforts on this segment of road. In the end, the County invested approximately $376,000 per mile to rehabilitate the 5.4 miles of eastern Warnerville Road from a gravel/dirt road, to an all-weather structural section capable of handling substantial truck loading even in the winter months. We feel this was a great success and money well spent!

2020 Update: We’ve successfully made it through our first harvest season and winter rains. The road is all-weather, rut free, and will be low maintenance for the foreseeable future!