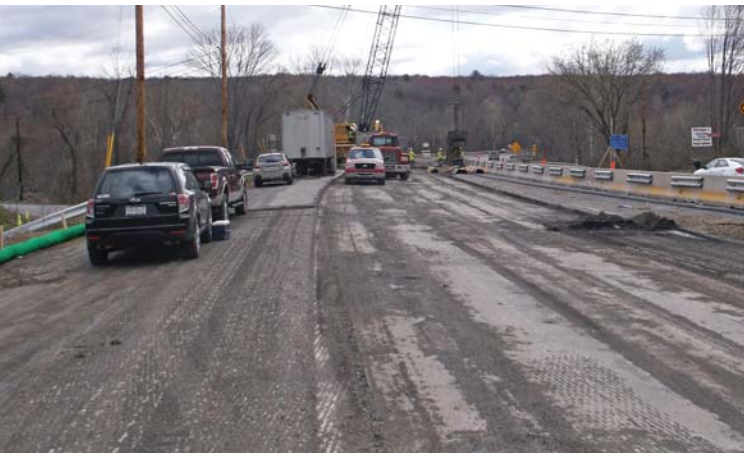
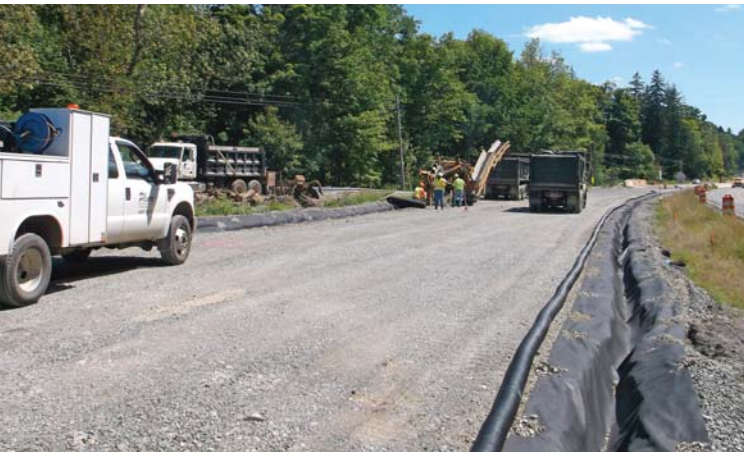
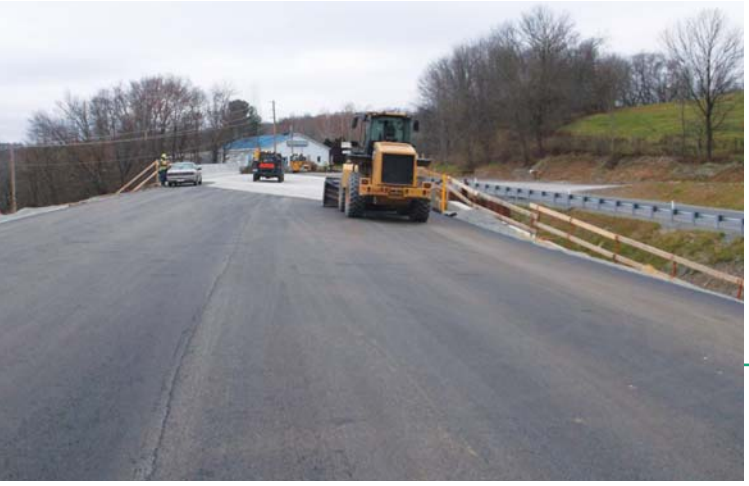
Lucky Lackawanna

Restoration project breathes new life into S.R. 6 in Pennsylvania







By Brian W. Budzynski
Managing Editor

Pennsylvania's S.R. 6 describes an almost river-esque course through Wyoming and Lackawanna counties, the topography of which ranges from urban centers to rolling hills of pure greenery.

The S.R. 6 Lackawanna Trail restoration project runs through the northern half of Lackawanna County and the southern half of Wyoming County, and, ultimately, the impact of its restoration will be felt by Clinton, La Plume, Glenburn and South Abington townships, along with Factoryville Borough and Dalton Borough. As one of the largest active projects in the state—and the flat-out largest in Lackawanna County—the $44 million project, running 8.5 miles consisting of just over 34 lane-miles, was conceived of a mixture of necessity, fortuity and patience.

John Urick, associate senior project manager for STV Inc., the primary design firm for the S.R. 6 project, has been at the design helm since the project's inception. "The Pennsylvania Department of Transportation (PennDOT) doesn't like to close sections of highway more than 3 miles at a stretch," Urick told ROADS & BRIDGES, "so we're splitting the project into three phases."

The respective phases, along with an initial project scheduling allowance for anticipated utility concerns, have allowed PennDOT and its partner contractor to maximize the northern Pennsylvania construction season.

"Success or failure depends on total team performance," Tommy Letwinch, director of business for HK Group Inc., the project's primary contractor, told ROADS & BRIDGES. "PennDOT, in my experience, is open to expanding the volume of material laydown but not the season itself. Our construction season typically runs April 15 through Oct. 15 in this district."

The stricture of this seasonal window is of particular importance on large-scale asphalt jobs, of which S.R. 6 is one.

The S.R. 6 Lackawanna Trail project was designed to phase out through 2017. In 2015, crews completed the westbound lanes, as well as superstructure and/or rehabilitation work on six bridges.

"So much of the placement of the bituminous is driven by ambient temperature," said Letwinch, "that in essence for PennDOT to extend the construction season would be to compromise its own specifications."

Meaning, time is of the essence.

Foresight

"We did a bunch of CBRs—California Bearing Ratio penetration tests—on the S.R. 6 site to test the strength of the subgrade," said Urick. "The values were all over the place. The highway was built, originally, mostly on an old railroad grade, which was then widened to accommodate four traffic lanes with a median. The embankments were a hodge-podge of who knows what, so the CBR test results indicated the value of the subgrade greatly varied along the project site."

Additionally, utility concerns—notably relocation, which is a challenging aspect of any road restoration project—were recognized early, and thus the project timeline could be graphed so as to address these concerns at the outset, rather than create a stutter-step plan that might have hampered the contractor's ability to leverage the construction season window to its fullest advantage.

"We delayed the start of the project to give a year to utility relocation," said Urick.

Bill Eckenrode, project manager for PennDOT, concurred. "There was quite a bit of utility work," he told Roads & Bridges. "A lot of water lines have had to be moved; a lot of overhead power and telephone and cable lines had to be moved. Gas lines, as well. One of the six bridges on the project had a gas line running through it, which had to be rerouted and then relaid once the bridge was built. But all that utility work was built into the schedule, so [there were] no delays."

Getting to grade

"The basic pavement design was to strip off the existing bituminous layer, rubblize the 9-in. reinforced concrete layer, and then place a fresh bituminous layer over that," Urick said. "It was the least expensive design, and a pretty environmentally sound practice, instead of pulling up all that material and leaving it in a landfill somewhere. In some areas, [based on CBR results], we had a full-depth reclamation design for subgrade stabilization and full replacement, as well."

FACT FINDER

Recycled asphalt pavement was employed in the warm-mix asphalt design at ratios of 15-25%.

Since this portion of S.R. 6 was constructed and then subsequently resurfaced over an unevenly graded area, crews found themselves working with variable depth reclamation.

"We're dealing with existing 9-in. depth concrete pavement that had been overlaid with bituminous over the years," said Eckenrode. "After we milled off the bituminous with Roadtec RX900 and RX700 milling machines to get back down to the original concrete for rubblization, we had anywhere from 2 in. to 8 in. of material with the reinforcing wire still in it. When we milled off the existing bituminous layer, we were supposed to put back 7 in. of blacktop, but in some areas, as we milled it off, we were only an inch or two from final grade. We weren't going to get that 7-in. package on there, which is why we put sub-base material on. A decision had to be made, and the decision was to raise the grade, instead of going all the way down and pulling out all that concrete."

This decision led to the application of 6 in. of sub-base material over the rubblized concrete pavement, which created the right kind of surface for HK Group's asphalt mix designs.

From design to drive

"After we seated our rubblized material with a 50-ton roller, and laid down the 6 in. of sub-base material, we could put down our paving structure," said Eckenrode.

"All mixes were PennDOT specified," Jason Allen, regional business manager for HK Group Inc., told Roads & Bridges. "Specific gradation and mix were supplied for [all three] levels of asphalt. We always try to utilize the maximum percentage of recycled asphalt pavement that's allowable in the mix, and on this project, it varied, mix to mix, from 15-25%."

When paving began in August 2015, HK, adhering to PennDOT specifications, developed warm-mix asphalt (WMA) designs over the hot-mix alternative.

"PennDOT has been doing a lot with WMA in most of the districts where we work," Letwinch said. "From our standpoint, WMA could conceivably increase the season a bit in terms of time savings. We've had greater success with regard to compaction. It comes up to spec quicker than the conventional HMA. We estimate we're getting about 20% in terms of time savings on the compaction alone."

"Our production mainline paving was completed at night," added Allen, "for a few reasons. First, there's less traffic and less congestion. [S.R. 6 withstands approximately 15,000 vpd.] Also, our asphalt plant providing the WMA has a significant daily, what we call 'drugstore' production traffic, largely of HMA, and we did not want to interfere with that operation."

Once the sub-base was on and rolled, crews put down a 25-mm PG 64-22 Superpave WMA base course (3-10 million equivalent single-axle loads [ESALs]), which broke down to 3 in. on the mainline, 4 in. on the temporary MPT widening, 4.5 in. for the recon areas leading into bridges, and variable depth application for buildup, profile adjustment and lane shifts, for a total quantity of 57,676 tons.

Following the base, the binder course, designed for a 19-mm PG 64-22 Superpave WMA, RPS (3-10 million ESALs), was applied at 2.5 in. along the mainline, for a total quantity of 51,464 tons. Finally, the wearing course called for a 9.5-mm PG 64-22 Superpave WMA, RPS (3-10 million ESALs), SRL L, M, and H, applied mostly at 1.5 in., with a bit over/under for scratch and grade adjustment, for a total quantity of 41,335 tons. The wearing course was subject to an bituminous pavement ride quality incentive, which was achieved. All three lifts were placed with the Cat 1055 paver enabled with automation and skies for grade control and then rolled with Dynapac 522 and Cat 534 rollers, which applied rolling patterns that were, according to Allen, "established daily by our on-site quality control team specifically for the material [being rolled]."

One down, two to go

Adaptability to compromised terrain and applying foresight to project challenges have kept the S.R. 6 project on a dependable timeline. The patience for project longevity and respect for Pennsylvania's construction season were leveraged to segue the project phases to be completed along three concurrent years.

"PennDOT does keep closures to no more than 3 miles," said Eckenrode. "So for this year's work, we completed the upper and lower portion of the westbound lanes—that includes the westbound sides of Lackawanna bridges on Rte. 6 over Glenburn Pond, Rte. 6 over Rte. 632 in Dalton, two structures on Rte. 6 over Tunkhannock Creek, and Rte. 6 over College Avenue and Rte. 11 over Rte. 6 in Wyoming County. We did a 200-ft x 20-ft reinforced concrete retaining wall, as well. Next year's the eastbound."

Letwinch sees the present success and anticipated future success of the S.R. 6 project as an amalgamation of hard work and mutual respect between company and agency. "You can only build as well as those you're building for. It's been a total team effort, and it will continue to be through the completion of the job. The project stands on time for the completed 2015 construction season, which went through stage 3 of the sequence plans. All travel lanes are open without restrictions for the winter shutdown. 2016 will continue with the eastbound limit of the project, and 2017 will be the interior limits connected to the east and west limits." AT