Bell Trucks Helps R&T Ellis Build Largest Roller-Compacted Concrete Development in the World

Northeast of Houston in the town of Plum Grove, a new subdivision is quickly growing with plans to be one of the largest in the area. The Santa Fe subdivision is being developed by Colony Ridge Land, LLC as part of a number of new communities they are creating in this once sleepy part of Liberty County.

The 6,400-lot restricted residential neighborhood and mixed-use community broke ground in March 2017 with section one of four, consisting of a total of 4,400 acres. To create such a large development Colony Ridge turned to R&T Ellis, Inc. of Cleveland, Texas, for the over 70 miles of roads that would be needed in this section alone.

Patrick Thiel at R&T Ellis convinced Randy Ellis that this was a great project for them.

"With experience in site work prep including clearing, grubbing, digging ditches, building roadbeds and delivering soil stabilization, R&T Ellis was in a unique position to provide a comprehensive turnkey solution to the owner by adding RCC paving," Thiel said. "This was and is a natural fit that will deliver value to the owner, the industry and the community."

R&T Ellis worked closely with the owner and Liberty County to come up with specifications and plans for the new roads. They ended up deciding on roller-compacted concrete (RCC) as the pavement method of choice.

Roller-Compacted Concrete

RCC is made up of the same ingredients as a conventional concrete mix (cement, water and aggregates), but uses a much drier mix than conventional concrete. The mix is placed with high-density asphalt paving equipment then followed by additional compaction with rollers.

For most of the roads in the subdivision, R&T laid down the pavement out of a Volvo P8820C Paver (the only one of its kind in the U.S.) at 5.5 to 6 inches at 4400 psi, but for the major thoroughfares, they used 7 inches that they then compacted with a rubber-coated double drum roller.

Going Above and Beyond

While the specs didn't call for it, R&T Ellis chose to go above and beyond with the project by adding expansion joints with fiber-fill and sealant every 500 feet and at every cold joint.

"The specs that we had didn't originally call for the expansion joints, but we knew that without them there was potential for road blowouts," Thiel said. "We elected to go in and cut out and install the expansion joints to help ensure that wouldn't happen."

"I wanted to make sure we were doing this project the right way and perfecting the RCC technique here so that we could show other developers that this is a great method for build-

ing roads," Ellis said. "We believe what we've done here is something that plenty of other people are going to want to copy, and we've got the experience and expertise to do it for them."

Bell Trucks Provides Perfect Fit

With the plan set, R&T Ellis needed a way to transport the RCC mix from the plant on-site to the paver. For this, Kevin Phillips with Four Seasons Equipment said he had the perfect solution.

"When Randy told me they were looking for trucks for this project, I knew the Bell Trucks would be perfect for him," Phillips said. "I showed him the new B20E model and within 3 minutes of seeing it, he was sold."

Left to Right: Kevin Phillips with Four Seasons, Shane Welch and Randy Ellis with R&T Ellis, Jan Prusinski with Cement Council of Texas, and Patrick Thiel with R&T Ellis

"The best part about the B20E was the size of the bed," Ellis said. "It fit into the hopper for the paver we had without needing to take three or four attempts to line it up just right."

Another important factor was the low ground pressure thanks to the low profile, extra wide 800/45 R30.5 tires that provide significantly reduced ground pressure and market-leading flotation in very muddy, soft or sandy underfoot conditions. This was important since the development has extremely fine-grade soil that most other trucks would get stuck in.

Since these were the first four B20Es sold in the U.S., Four Seasons Equipment brought out two Bell Trucks technicians to help ensure that R&T Ellis was getting everything they could out of the trucks.

"We know how important uptime is to any contractor, so we wanted to be out here to make sure they weren't having any trouble with their new machines," Phillips said.

With section one nearly completed, R&T Ellis has started to clear the next section of the development. Once all four sections are finished, they are looking toward the 6,000-acre phase two, which will require an additional 130 miles of roads, but Ellis is not worried.

"We continue to learn and improve based on our experience from section one, and we are excited about carrying this knowledge on to the remaining sections and the next phase," Ellis said. "It has been a pleasure having a collaborative environment with the owner and Liberty County to deliver this high quality pavement for their residents."

The RCC Paving Alternative

Roller compacted concrete (RCC) pavement is concrete pavement placed in a different way. RCC merges concrete and asphalt technology to produce a durable, rigid pavement that is placed quickly, trafficked early and provides a low-maintenance service life.

Key factors in RCC efficiency are:

- Mixtures utilizing well-graded 3/4 inch or smaller aggregates
- High-volume production with a continuous pug mill
- No reinforcing steel or dowels
- Fast placement with heavy-duty asphalt-style pavers that attain 90-98 percent initial compaction, up to 10 inches thick and 40 feet wide
- Full density reached quickly, with vibratory steel drum rollers
- One-day early trafficking achievable after curing compound application and saw cutting

RCC is most competitive with larger projects that have fewer obstructions. Industrial and military facilities are a proven "sweet spot" for RCC. More recently, street and highway projects at the local and state level have been successful.

Texas is home to not only the oldest RCC pavement in the U.S. (Fort Hood, 1984), but also the largest volume of RCC placed with a single owner location (Port of Houston's Bayport Terminal), and the largest residential RCC developments (Santa Fe neighborhood in Liberty County). Also, Texas DOT has used RCC in selected projects. RCC is an important pavement alternative that can provide the strength, durability and longevity of concrete pavement at a speed faster than asphalt and at a highly competitive cost.