For years Keystone Road in northern Pinellas County, Florida, was a two-lane road bursting at its seams with a throng of bumper-to-bumper traffic. The web of aging utilities underground and overhead was equally problematic, raising the question of how to safely and efficiently reroute and upgrade the infrastructure without disrupting service and further clogging traffic on the vital roadway.

Complicating matters was the rolling terrain of the corridor—uncommon in this part of the state—as well as nearby lakes, wetlands, a broad mix of residential properties, and businesses. Keystone Road is a major Hurricane Evacuation Route, meaning it must remain open. Any detour on this main point of entry to the City of Tarpon Springs would have forced traffic miles to the north or south, causing huge problems for commuter traffic that has increased substantially because of the area’s growth.

Today, the expansion of the 3-mile section of Keystone Road to four lanes between US 19 and East Lake Road is providing motorists a safer, smoother, and less-congested ride. Bicyclists and pedestrians enjoy the new multimodal trail that runs parallel to the roadway and links to the nationally recognized Fred E. Marquis Pinellas Trail. The City of Tarpon Springs has upgraded utilities to keep the City functioning well for years. The roadway facility was designed for future expansion to six lanes. And the $30 million, three-year project was completed more than $1 million under budget and 140 days ahead of schedule.
“Everybody loves the corridor. It’s so scenic now,” said Joseph DeMoss, engineering support services supervisor for Pinellas County who oversaw the project. “It’s clean, it’s open, and traffic flows very well.”

Gary Schurman, engineering projects supervisor for the City of Tarpon Springs, echoed those sentiments. “It’s a massive improvement for the City,” he said.

The overall Keystone Road project was more than a decade in the making for Pinellas County. The City also had been planning to upgrade its major utilities crossing under the road on county land for years. Ayres Associates provided roadway, structural, and drainage design; a maintenance of traffic plan; public involvement; utility coordination and relocation; permitting assistance; wetland mitigation; and photogrammetry for the County. Ayres provided design services for the utility relocation and upgrades for Tarpon Springs under a separate contract. David Nelson Construction of Palm Harbor, Florida, was the general contractor.

“I think it went as smooth as could be,” said Brian Symanski, project manager for David Nelson Construction. He noted that during three years of construction they received few complaints, there were no major accidents, major construction issues were solved efficiently, and the overall team worked well together.

“We were out there every day, so you don’t realize all the improvements that were made,” he said. “But you look back at before and after pictures and realize just how much it has changed.”

Some utilities under Keystone Road were more than 50 years old. During construction the contractor discovered that older utilities crossed or were not accurately marked in previous plans. With the mass of stormwater improvements and retaining walls required for the project, finding new routes for the utilities also was a challenge.

The project included eight stormwater retention ponds, 31 retaining walls, and more than 6 miles of drainage pipes up to 72 inches in size to control stormwater runoff, as well as sanitary sewer, overhead distribution and transmission lines, underground gas mains, and underground fiber optic cables.

“It was just like a spaghetti of lines under this road – spaghetti lines of 30-inch and 48-inch pipes,” said Dori Sabeh, Ayres Associates’ lead designer for that portion of the project.

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The City’s main potable water supply – an old 20-inch cast iron pipe – was relocated outside the pavement area. The pipe provides water to more than half of the City’s 24,000 people. The City’s goal was no interruption of water service for residents and businesses during the project, Schurman said. Ayres Associates’ custom-designed thrust blocks and anchors allowed for the process to be completed smoothly.

Schurman said he is amazed the utility portion of the project went as well as it did.

“In preparation for the project, we did a lot of study on the water line itself – testing valves, determining which ones worked, which ones didn’t,” he said. “We went through the whole exercise in case there was any kind of failure. Our staff was trained in what to do. Failure of a 20-inch water line would have been a big deal.”

The corridor required miles of retaining walls that included cast-in-place, concrete sheet pile, steel sheet pile, and mechanically stabilized earth-type, said Hisham Sunna, who oversaw structural engineering for Ayres Associates. Groundwater elevations and lack of available right-of-way required various types of walls to be used depending on site conditions. Many walls were designed so the contractor could select what materials worked best for that particular area and could be constructed at the least cost, Sunna said.

Of the eight stormwater retention ponds, two are dual-use ponds where available land for pond sites was limited, said Tim Foushee, who led Ayres Associates’ stormwater design and permitting of the project. The sites use a watertight sheet pile wall to divide between stormwater detention and floodplain compensation without sacrificing precious volume. Ayres Associates also assisted navigating the project through a complex permitting environment, including a Sovereign Submerged Lands easement for a retaining wall along Salt Lake.

Flexible construction staging and traffic control plans accommodated numerous residents and businesses and the roadway’s many users during construction, and public involvement was vital, DeMoss said. The County, City, Ayres Associates, and David Nelson Construction worked together to get advance notice to residents, commuters, and businesses about major construction activities. The County created several public service videos, maintained a telephone question-and-answer line and project website, gave quarterly updates, and hosted several public meetings.

“Ayres, overall as an organization, was very responsible during the entire project,” DeMoss said. “The staff were very accommodating and honest. … It was a long, complex project with lots of changing conditions. There were a lot of things that made this project challenging, and in the end Ayres and David Nelson Construction came through and did a phenomenal job.”
Utility improvements challenging part of project

People driving, bicycling, or walking along Keystone Road certainly notice the visual appeal of the new corridor – the pavement, improved views, and sidewalks and trail. But it’s the work that occurred underground that caused the biggest obstacles and required the most decision-making during design and construction.

Relocating or upgrading the major utilities under or above a major thoroughfare reconstruction like Keystone Road always is a challenge, said Brian Symanski, project manager for David Nelson Construction, the project’s general contractor.

“The County and City gave us as much data as they could,” he said. “We found a lot of times that when we got in there, the lines where not where they were shown. They were deeper, shallower, or in a different horizontal alignment. That made things a lot more difficult, a lot trickier. You wonder how they laid it originally.”

The contractor was flexible during construction, and working with Ayres Associates as the designer, the unforeseen circumstances were remedied quickly, said Joseph DeMoss, engineering support services supervisor for Pinellas County.

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Project receives ACEC state finalist award

A redevelopment project that transformed a blighted, run-down area of Wauneka, Wisconsin, into a thriving student housing complex has earned a 2015 Engineering Excellence State Finalist Award from the American Council of Engineering Companies of Wisconsin. Ayres’ environmental engineer Lynn Scherbent managed the Carroll University Student Living and Business Center project. ACEC WI will recognize the project at its March 20 awards banquet in Kohler.

Clobber leads hydraulics research committee

Paul Clobber, director of applied technology for Ayres, was recently appointed chairman of the Hydraulics Subcommittee of the Transportation Research Board’s Committee on Hydrology, Hydraulics, and Water Quality. The subcommittee identifies gaps in knowledge where the worlds of water and transportation intersect, and it encourages research to close those gaps. The result is better guidance for Departments of Transportation on how to design highways, bridges, and other transportation infrastructure.

Efficient homes earn awards

Focus on Energy recently announced the locations of the most efficient new homes built in Wisconsin in 2013, and six of the top 10 are in the Eco Village development in River Falls. Matt Frisbie, Ayres’ vice president of architecture, helped with design in support of the project. Sustainable development. Ayres’ new River Falls office – the former Frisbie Architects – donated at least 800 hours of design time to the project. Sustainable construction magazine Green Builder also announced that the Eco Village is a finalist in its annual Home of the Year Competition.

Thrust blocks are anchors used to counter the thrust forces that occur at changes in direction, at changes in the cross-

Transportation Engineering manager named

Brian McKee has been promoted to manager of transportation services for Ayres Associates’ Southeast Operations. He will supervise staff providing transportation-related services in the firm’s Florida offices in Jacksonville, Tampa, and Sarasota. McKee joined Ayres in August 2011 and has more than 21 years of engineering experience.

2014 construction awards announced

A bridge designed by Ayres Associates, in cooperation with Dane Partners, won a Special Recognition Construction Award at the recent Contractor-Engineer Conference in Middleton, Wisconsin. The project involved the construction of the IH 39 southbound bridge over Sigelkow Road in Dane County. Ayres’ design of the bridge included precast pier elements, which WisDOT has done only once before. The precast elements consisted of the pier columns and pier cap. This innovative design allowed for the contractor to construct these elements off-site, saving valuable time on the time-sensitive project. Dane Partners is a joint venture of Ayres, EMCS, OTIE, and SEH.

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