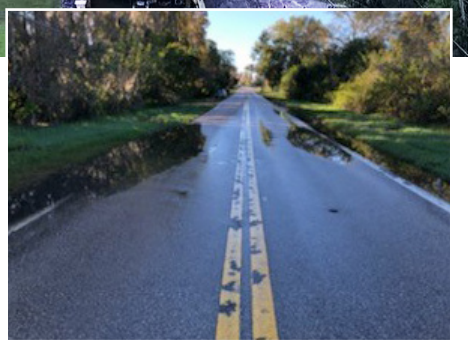
Project Spotlight

West Lake Eloise Drive - Winter Haven, Florida

Owner: Polk County Roads & Drainage, FL
Engineer: Madrid CPWG
General Contractor: Hubbard Construction
Installer: CellFill

Background Information



Located between Lake Eloise and Lake Lulu, West Lake Eloise Drive in Winter Haven, Florida, is situated on low-level ground surrounded by water and marshes. Since its initial construction in the 1940s, the roadway had experienced continuous settlement with an estimated total settlement of more than four feet (at the worst location). The settlement occurred due to extremely soft, organic sub-soils consisting of peat and muck, which also led to seasonal flooding, road closures, and expensive maintenance and construction costs. Over the years, approximately five layers of asphalt (with additional road base and fill soil layers) had been added to the roadway in attempts to mitigate these issues; however, the additional weight of those layers simply caused further settlement.

In 2017, Polk County decided that the roadway was in need of a more extensive evaluation and remediation that would include elevating the roadway by at least one foot. This project would require a unique backfill solution, as most traditional materials would have increased the weight placed on the soft sub-soils and further exacerbated settlement. Permeable low-density cellular concrete (PLDCC) presented a viable option that would decrease the weight placed on the underlying soils while also facilitating the elevation of the roadway and addressing the high water table present on both sides of the roadway. The use of PLDCC would also reduce the construction timetable, enabling the roadway to be re-opened as soon as possible. The project engineer, Madrid Engineering Group, Inc., based in Bartow, Florida, chose to use AQUAERiX™ PLDCC manufactured by Aerix Industries™ for this complex application.

Project Details

The remediation of West Lake Eloise Drive began with dewatering the jobsite, which involved the placement of well pipes along the 470-foot-long portion of roadway. The well pipes were driven twelve feet underground and spaced six feet apart along both sides of the roadway. While dewatering was in progress, the roadway was excavated and all existing material was removed, including all layers of sand, concrete, and asphalt. The extreme settlement of the roadway was evident during the excavation in the fact that two-thirds of the excavation, toward the center of the roadway, terminated within an existing asphalt layer while outer portions of the excavation terminated in sand and limerock road base at the north end and exposed peat at the south end.

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Project Details, continued

Once the excavation was complete, the PLDCC was pumped into the three-foot-deep excavated area at a rate of 160 cubic yards per hour. A total of just over 1,400 cubic yards of AQUAERiX PLDCC was used at an average thickness of approximately 2.8 feet. Helical anchors were placed in the excavation area to prevent any potential uplift that could occur during the construction phase in the case of a high-water event. The PLDCC was placed in a single lift in just nine hours over a two-day span, enabling construction to be completed much more quickly than would have been possible with the use of a traditional fill material. After the PLDCC was placed and fully cured, eighteen inches of the crusher concrete was compacted, and a layer of asphalt base was placed on top.

Aerix Added Value

The use of AQUAERiX PLDCC at West Lake Eloise Drive provided a number of unique advantages. Due to its permeable characteristics, PLDCC's replacement of the roadway's underlying soft soils enabled water to flow through, reducing buoyancy and hydrostatic pressure while also equalizing the water levels between the surrounding lakes. Additionally, its lightweight properties were essential for ensuring the minimization of any future settlement of the roadway and its underlying soils. With AQUAERiX PLDCC as its foundation, West Lake Eloise Drive is finally high and dry—carrying traffic without interruption and saving Polk County thousands in maintenance costs.