



Palmetto Expressway Section 5, Miami-Dade County, Florida

Section 5 of the Palmetto Expressway Improvement Program in Miami-Dade County (Florida) is a \$559 million, design-build-finance project that reconfigures the roadway where SR 826 (Palmetto Expressway) and SR 836 (Dolphin Expressway) meet in Miami. The project, which many participants say is the biggest and most complex of their careers, is the last and largest of the 12-section reconstruction of the Palmetto Expressway.

Section 5 entails the construction of a four-level interchange (**Fig. 3, 4 and 5**) at SR 826 and SR 836, as well as the reconstruction and modification of two existing interchanges. This section carries great regional importance because the Dolphin Expressway is a major route to Miami International Airport. More than 430,000 motorists use the interchange daily.

Four complex precast segmental bridge ramps – bridges 9, 11, 15 and 19 – will traverse the core of the interchange. These four bridges are 46 feet wide and range in length from 1,100 feet to 2,450 feet. Total deck area is 360,718 square feet, with 7,764 linear feet of bridge. The longest span is 266 feet, the tallest pier is 81 feet and there are 775 total segments. **Finley Engineering Group (FINLEY)** is providing design and construction engineering of the four precast segmental bridges.

The curved segmental bridge ramps are the third level of the interchange with radii down to 590 feet and a proposed maximum superstructure deck height of 95 feet above ground. All of the bridges are supported on 24-inch pile foundations and reinforced concrete piers and caps.

Most notable and significant among the design solutions was a “top-down” construction approach. Rather than assembling the precast sections by raising them into place from below, the project team will use a self-launching overhead gantry supplied by **DEAL** to build the bridges in balanced cantilever, outward from the piers, similar to constructing over water. There will be no temporary ground supports and segments will be stabilized off the pier caps.

Begun in the early 1990s, the Palmetto Expressway Improvement Program redesigns and reconstructs the interchanges along a 16-mile stretch of the expressway. The project adds one travel lane in each direction, widens and replaces bridges, increases shoulder widths, reconfigures entrance and exit ramps at all interchanges, and improves drainage, signalization, lighting and signage.

Capacity improvements include road widening and the construction of 46 bridges, new direct connector ramps for major improvements and collector-distributor ramps to eliminate existing geometric and operational deficiencies.

Innovative design solutions include using non-traditional shaped piers, adjusting footing sizes to accommodate site



Figure 4 – Palmetto Section 5 – SR-826 (Palmetto Expressway) / SR-836 (Dolphin Expressway) Bridge 15. (Rendering Courtesy of Finley Engineering Group)

Figure 3 –
Palmetto Section 5 – SR-826 (Palmetto Expressway) / SR-836 (Dolphin Expressway) north view.
(Rendering Courtesy of Finley Engineering Group)

conditions, and increasing span lengths, all of which helped improve maintenance of traffic (MOT) sequencing.

MOT was also critical to accelerating the project schedule. Bridge 19, a major flyover on the south side of the interchange, will be the last of the four opened to traffic. Yet, to accommodate the coordinated construction sequencing that minimizes the impact on traffic, three of Bridge 19's foundations will be built in the earliest stages of the project, long before they'll be needed to support the bridge.

Another notable aspect of the project is that the design team is using bridge information modeling (BrIM) on the segmental bridges. BrIM infuses 3D CAD models with data that allow engineers and technicians to more easily and efficiently manipulate design and construction drawings. The project team is incorporating

information from a variety of software programs, including **Bentley** RM 3D, Microstation v8i, and REBAR.

This project timetable, which calls for completion by the fall of 2015, was two months ahead of schedule as of November 2010. At that time, the foundations and substructure work had started, the casting machines and launching gantry were in fabrication and the casting yard was being

prepared. Segment casting was set to begin in early 2011 and erection in late summer of 2011, under the direction of **Rizzani De Eccher**.

The **Florida Department of Transportation (FDOT)** is overseeing the project and providing funding in conjunction with the Miami-Dade Expressway Authority (MDX) and the American Recovery and Reinvestment Act (ARRA).

Owner: **Florida Department of Transportation**

Prime Design Consultant: BCC Engineering, Inc.

Segmental Bridge Design and Construction Engineer: **Finley Engineering Group**

Contractor: Community Asphalt Corporation, **Condotte America, Inc.**,
the De Moya Group, Inc., JV, LLP

Overhead Gantry and Casting Machines: **DEAL**

Bearings and Expansion Joints: **The D.S. Brown Company**

Casting and Erecting Segments: **Rizzani De Eccher**

Figure 5 –
Palmetto Section 5 – SR-826 (Palmetto Expressway) / SR-836 (Dolphin Expressway) southeast view.
(Rendering Courtesy of Finley Engineering Group)

