

# FDOT Transportation Innovation Initiative: FRP – Design Innovation

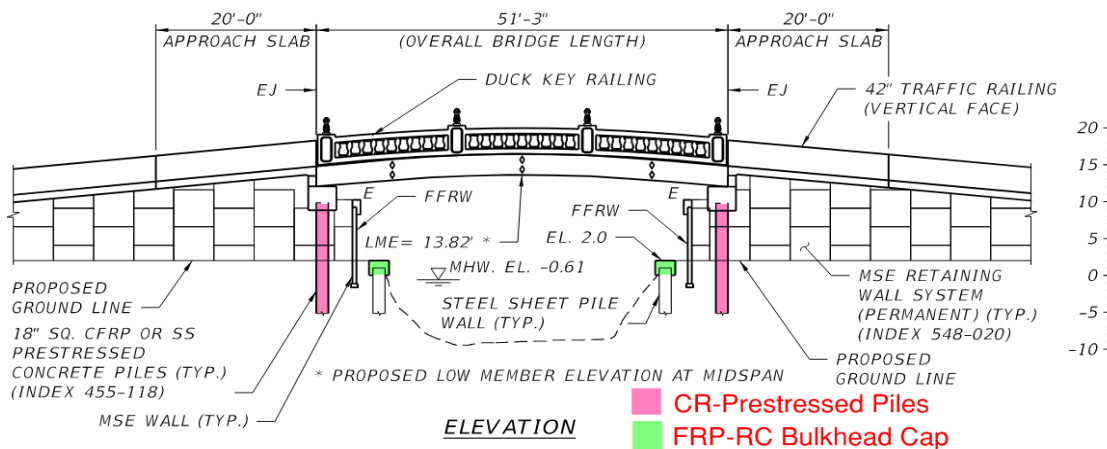


Fast  
Facts:  
B/GFRP  
Reinforcing  
&  
CFRP/HSSS  
Prestressing  
Strands



<b>Project Location:</b>	Duck Key, Florida
<b>Agency:</b>	Monroe County
<b>URL:</b>	<a href="http://www.fdot.gov/structures/innovation/FRP.shtm">http://www.fdot.gov/structures/innovation/FRP.shtm</a>
<b>Project Name:</b>	Bimini Drive Bridge Replacement Bridge No. 904603 (Existing) Bridge No. 904613 (New)
<b>Project Description:</b>	Replace bridge and bulkhead seawalls
<b>Project Purpose &amp; Need:</b>	Bridge Inspection Reports identified poor condition rating of the substructure, superstructure, and deck due to corrosion. Work activities included roadway approaches, replacement of existing bridge, retaining walls and bulkheads while maintaining the historic character of the bridge. Foundation utilizes CFRP/SS-PC 18” Square Piles as well as a new seawall with a GFRP-RC cap.

What was unique about this project? FRP reinforcement is used in the bulkhead cap, and CFRP or HSSS in the prestressed concrete piles located in the splash zone, to reduce future maintenance requirements.



**Describe Traditional Approach:**

Traditional approach includes installation of grade 60 steel rebar in a cast-in-place bulkhead cap and precast pile stirrups, and prestressing with ASTM A416 carbon-steel strands.

**Describe New Approach:**

Utilization of GFRP bars in lieu of traditional carbon-steel rebar in the bulkhead cap, and prestressing with CFRP strands or HSSS strands with CFRP or SS spirals, respectively for confinement.

**Top Innovations Employed:**

Utilization of FRP or SS bars and corrosion-resistant prestressing within the splash zone/marine environment.

**Primary Benefits Realized/Expected:** Longer service life of the bulkhead-seawall and bridge foundation.

**Project Start Date/Substantial Completion Date:** 1/1/2021 – 7/1/2021 (estimated)

**TABLE OF FRP RELATED QUANTITIES:**

SECTION	PAY ITEM NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY		
				PHASE I	PHASE II	TOTAL
	0108 2	MONITOR EXISTING STRUCTURES - VIBRATION MONITORING	LS	-	-	1
	0455133 2	SHEET PILING STEEL, TEMPORARY CRITICAL*	LS	-	-	1
FOUNDATION	0455 34 23	PRESTRESSED CONCRETE PILING, 18" SQ W/FRP OR STAINLESS STEEL STRAND AND REINFORCING	LF	300	450	750
	0455143 23	TEST PILES-PRESTRESSED CONCRETE, 18" SQ W/FRP OR STAINLESS STEEL STRAND AND REINFORCING	LF	180	-	180
	0459 71	PILES, POLYETHYLENE SHEETING	SY	40	40	80
	MC10	DUCK KEY RAILING	LF	52	52	104
WALLS	0400 4 8	CONC CLASS IV, BULKHEAD	CY	10.3	13.3	23.5
	0415 10 5	FIBER REINFORCED POLYMER BARS, #5 BARS	LF	790	1021	1811
	0455133 3	SHEET PILING STEEL, F&I PERMANENT	SF	1398	1823	3221



**Affiliations:** PE Consultant: KCA  
 Construction Contractor: TBA  
 Construction Engineering Inspection: TBA

**Project Contacts:** Engineer of Record: Austin Black, P.E.  
 KCA