VDOT's Vital Infrastructure: Large Complex Structures

Type	No.	Structure	Age	Route Carried	Feature Intersected	Condition
Large and Complex	13	460 Connector	1	Rt. 460	Grassy Creek	Good
	14	Varina-Enon	28	I-295	James River	Fair
	15	MMMBT Approaches	26	I-664	James River	Fair
	16	James River Bridge Approaches	38	Rt. 17	James River	Fair
	17	Norris Bridge	61	Rt. 33	Rappahanock River	Fair

Route 460 over Grassy Creek (#13)

Varina-Enon Bridge: I-295 over James River (#14)

Monitor Merrimac Memorial Bridge Tunnel Approach Bridges I-664 over James River (#15)

James River Bridge: Route 17 over James River (#16)

Norris Bridge: Route 3 over Rappahannock River (#17)

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Large Complex Structures—Common Elements

Post-Tensioned Bridge

Post-tensioned bridges employ high-strength steel strands, similar to wire ropes, to hold segments of the bridge together. Multiple steel strands are placed inside a hollow duct, and together a duct and the strands inside are collectively referred to as tendon. The strands are pulled with extremely large forces after being placed in ducts. Those large forces are referred to as "post-tensioning" forces, and they serve to connect separate segments and serve a crucial function in the load-carrying capacity of the bridge. After post-tensioning forces are applied, grout is pumped into the ducts in order to protect the tendons from corrosion. At the ends of the segments, tendons are anchored using an anchorage system.

Tendons

Tendons are strands that are pulled with extremely large tension force to create internal forces within the precast concrete segments. Tendons are grouted along their entire length to protect the strands from corrosion. A cross section of a grouted tendon is shown on the right.