I-95 Bridge
Memorial Bridge
Existing Sarah Mildred Long Bridge
Portsmouth, New Hampshire
Kittery, Maine
Piscataqua River
Site Plan - Looking Southeast
High Level Bridge
CM/GC Team Organization
CM/GC Process

- Design Team selected by RFP
  - FIGG – H&H JV selected September 2012
- CM Contractor Selected by RFP
  - Cianbro Corp. selected January 2013
- Independent Cost Estimator (ICE) selected by RFP
  - HDR Engineering selected February 2013
- Construction Contract negotiated (GC)
  - Agreed to Construction Contract November 2014
Horizontal clearance is the clear and **unobstructed** navigational portion of the Piscataqua River that provides safe passage - measured perpendicular to the channel.
New Bridge
Horizontal Clearance

- Tower Protection (Typical on perimeter)
- Horizontal Clearance in Channel
- Up to 165’ Ship Width
- 10’ Clear
- 250’ Horizontal Clearance in Channel
- New Alignment
- 25
- 15
Hybrid Lift Span Clearances

Resting:
The position at which the lift span of the bridge will typically be. This position allows motor vehicle and cyclists to cross the bridge. It provides a 56' clearance for vessel passage, reducing the number of lifts by 68% over the existing bridge.

Raised:
When the bridge is in the raised position, its broad clearances and straightened navigational alignment will allow passage of large, modern ships into the port.

Lowered:
When needed, the lift span can also be lowered to allow trains to cross. The technology used on this state-of-the-art bridge will ensure reliable and rapid raising and lowering operations.

2600+ openings per year
68% < 50'
Existing clearance
10' closed
135' open
Foundation Design

- CM/GC Process allowed design team to consult multiple drillers during design process
- Drillers concerned with sloping rock and low RQD (fractured rock)
- Conducted side scan sonar to look for obstructions
- Final negotiations established a shared risk pool to deal with sloping rock
Reducing Risk

Train Location
Current location of B&M Locomotive #3666 and its tender car.
Foundation Construction

- Economical to use fewer large diameter shafts
- 29 total 10’ diameter shafts within river
- Designed heavily reinforced shafts to withstand vessel collision
- CM involved in mix design parameters and reinforcing type and layout

- 10’ shafts – 1818 LF
- 9.5’ rock sockets – 897 LF
- 424 HR of sloping rock cost shared
- Shafts work June 2015 - May 2016
Foundation Construction

- Case Foundation subcontracted
- Casings installed into rock with Kelly-bar crane attachment
- Rock sockets drilled with Wirth drill
- Mini-SID used to inspect rock socket
Substructure Construction

- Tower Piers consist of 9 precast sections
- LWC used to control pick weight
- Post-tensioned and grouted

- 3000 CY concrete infill (3 lifts)
- 250,000 lb reinforcement
Lift Tower Design

• Project Team evaluated concrete towers vs traditional steel towers
• Owner decision to pursue concrete
• Enhanced durability in marine environment
• 30% cost estimate showed similar cost
• Provides interior environment for Mech/Elec.
• Final tower shape balances constructability with aesthetics
Tower Segment Casting

- Owner negotiated three year lease of adjacent Port facility
- Segments cast, stored and loaded from the Port
Tower Segment Erection

- Casting from 8/2015 to 1/2017
- Erection from 8/2016 to 2/2017
- 88 total tower segments
- Approximately 100 tons each
• Modified Tower Drive allows all mechanical and electrical systems to be installed far in advance of the lift span
• Allows for careful setup and testing prior to float-in.
Hybrid Lift Span with Vehicles

Fabricated by Casco Bay Steel

- Team evaluated traditional truss vs steel box girder
- CMGC Process engaged several fabricators for input
- Significant cost reduction from 30% to 100% due to simplification of fabrication
Hybrid Lift Span with Vehicles

Railroad Tracks on Deck of Lift Span

42’ - 7”

14’

5’-7”
Approach Bridge & Lift Span in Normal Vehicular Position

- Deck Width Transition
- Railroad Tracks on Lift Span

Measurements:
- 37' - 4”
- 5' - 7”
- 42' - 7”
Hybrid Lift Span with Vehicles

Lift Span Box Transportation

- 300’ lift span
- Six main modules
- 14 total pieces
- 4,000,000 lbs
- Exterior coated with 14-17 mils zinc thermal spray
- 9” reinforced LWC topping
Hybrid Lift Span with Vehicles

Lift Span Box Assembly
Float-In  October 2017
Approach Bridge Superstructure Type

- Precast Segmental chosen
- 355 total precast segments
- Integral pier cap at shared piers
- Intermediate monoshaft piers for railroad
- Typical Span Lengths:
  - 320’ Vehicular
  - 160’ Railroad
- Bridge length 2780’
Approach Bridge Segment Casting
Unistress Corp. Pittsfield, MA

- 355 total segments (RxR & Veh.)
- Casting began 8/2015
- Casting completed 5/2017
Approach Bridge Segment Erection

- Erection Began: 8/2016
- Erection Completed: 9/2017
- Balanced Cantilever
- Erection continued through winter with cold weather segment epoxies