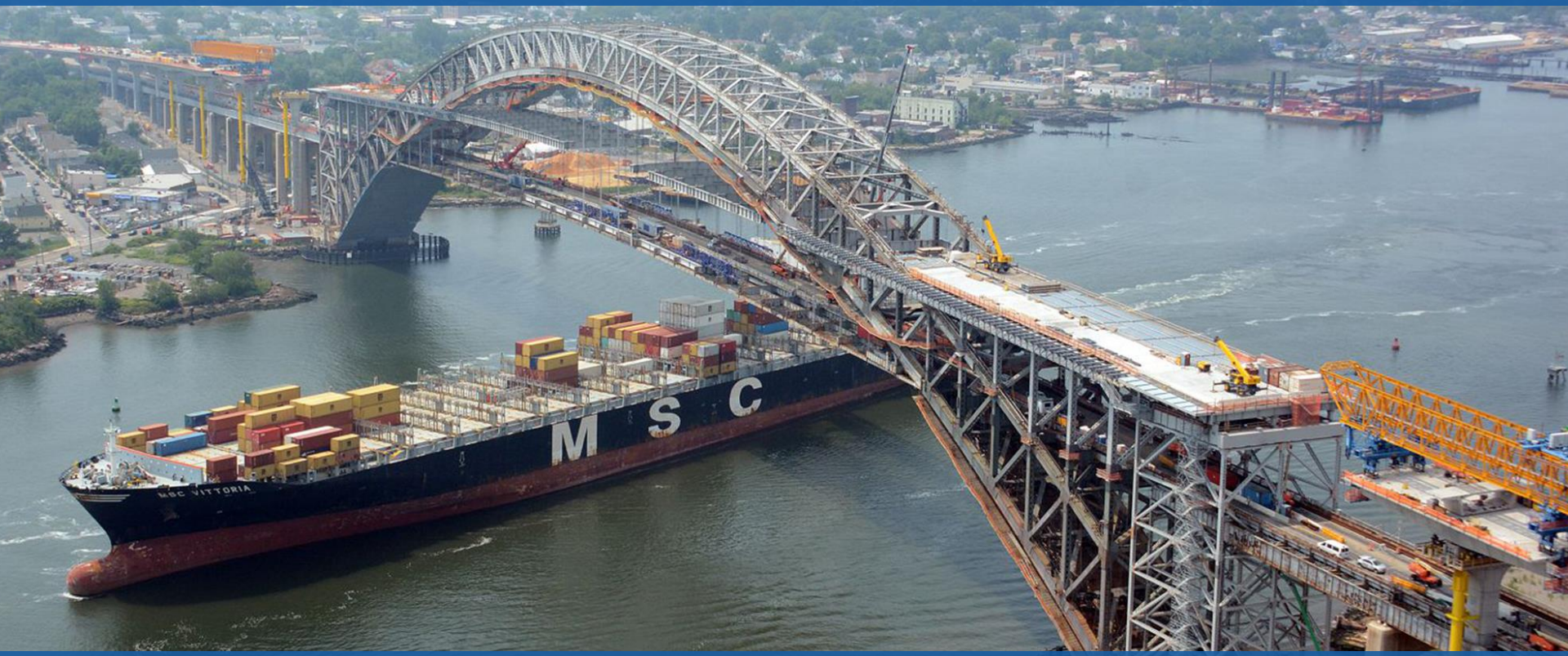
The Bayonne Bridge: Project Development



Joseph LoBuono, PE (HDR/WSP)

Engineering Symposium
Rochester 2018
April 24, 2018

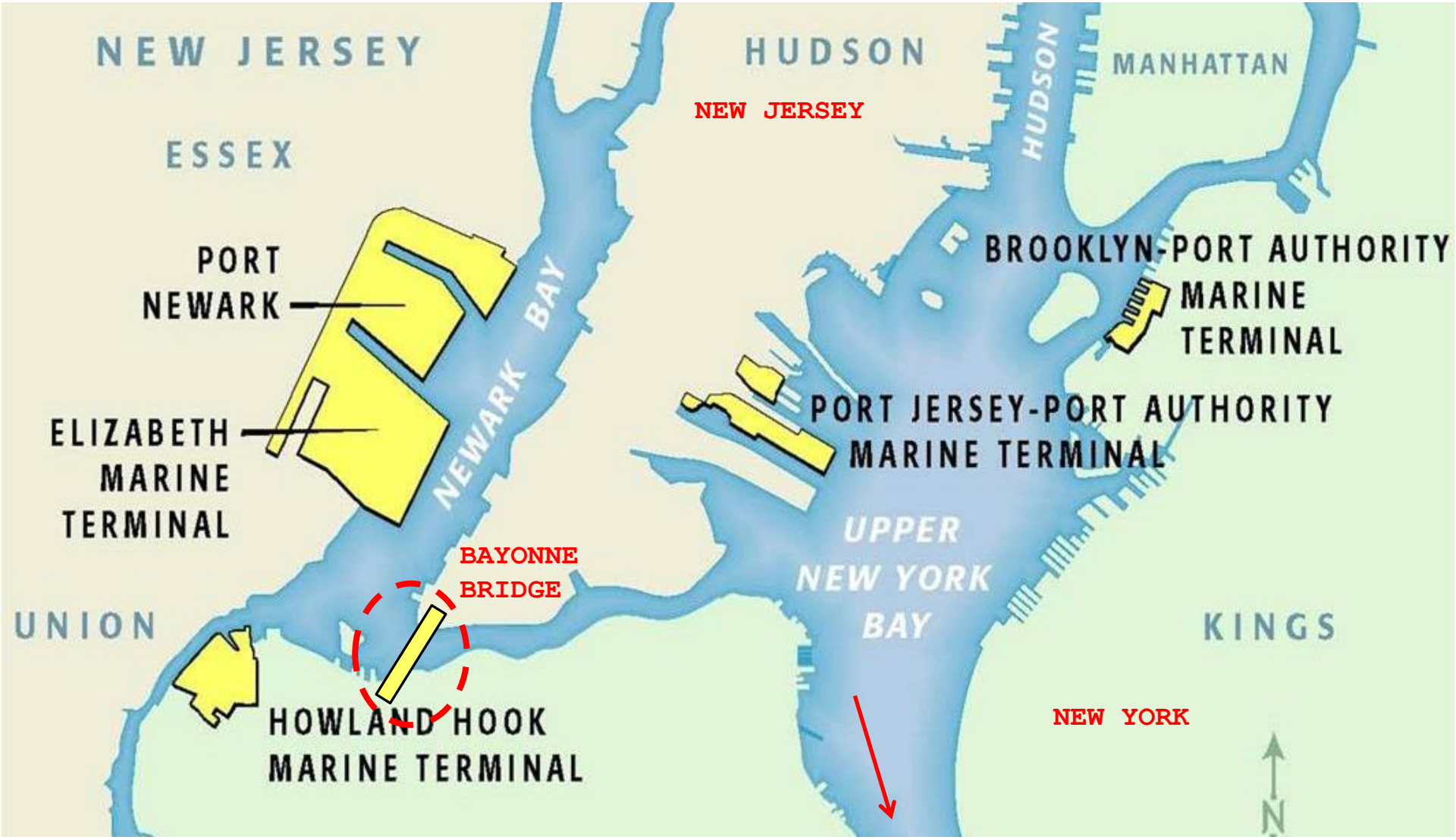
01 **Project Development**

02 **The Project**

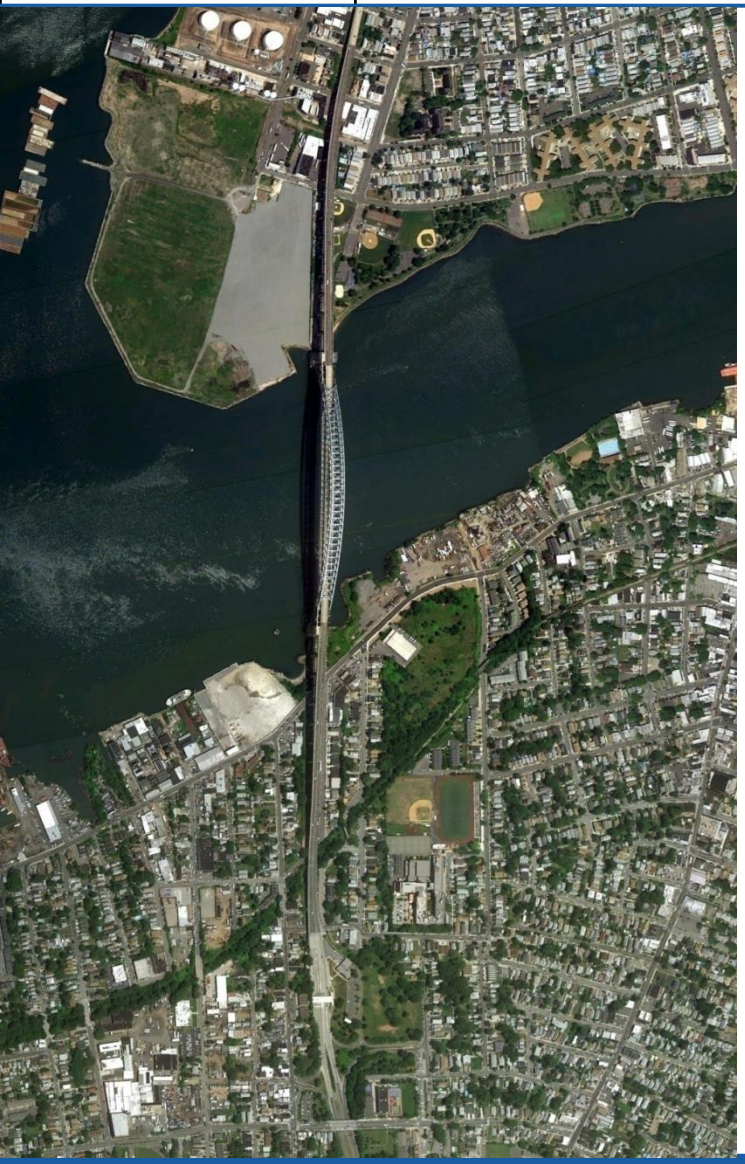
01

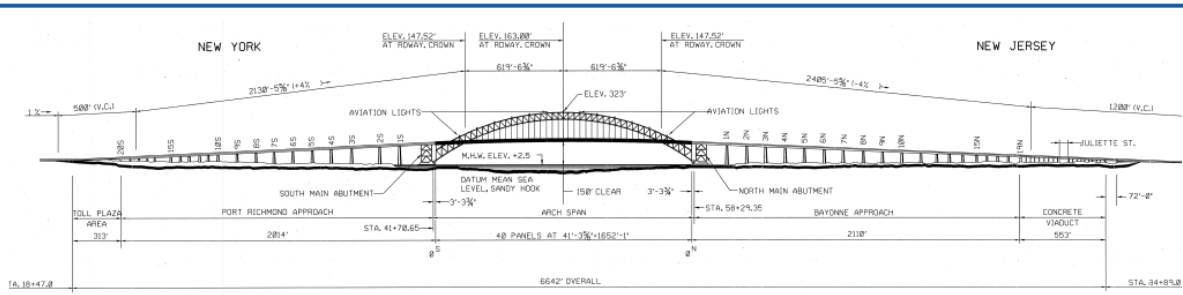
Project Development

The Port of New York and New Jersey

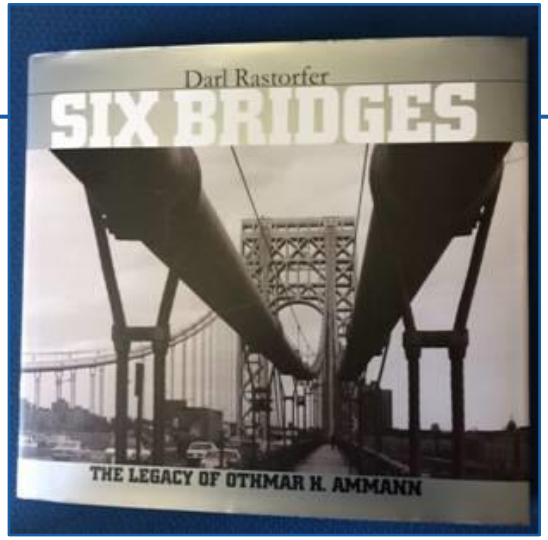


Existing Facility





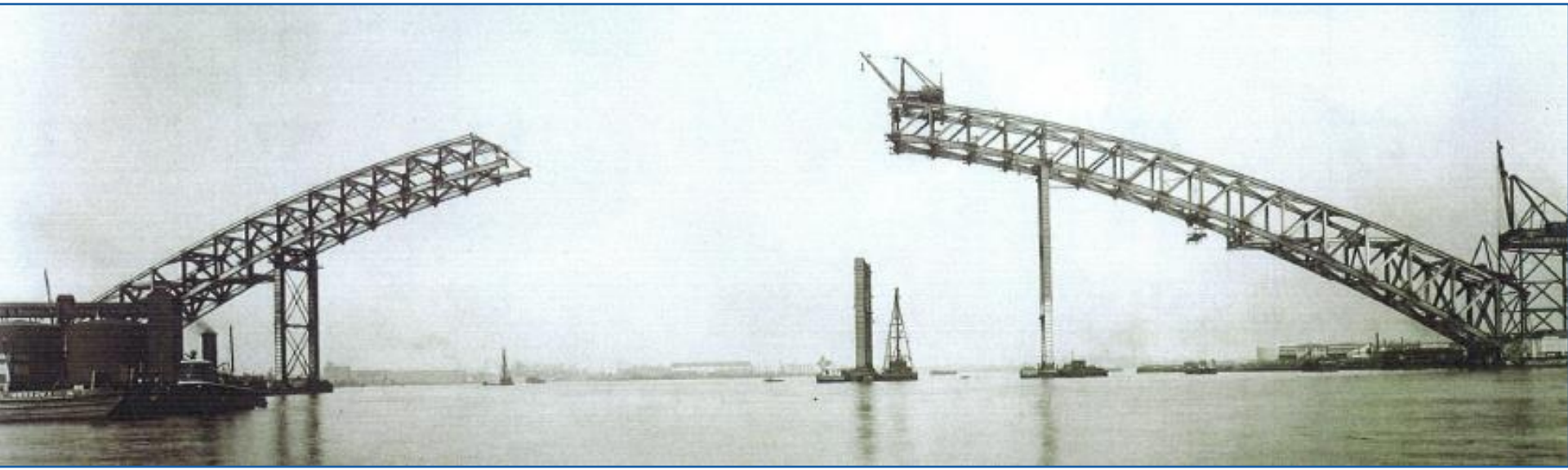
Bayonne Bridge History



- *Designed by Othmar Ammann and Cass Gilbert*
  Also Designed The George Washington Bridge; Triborough Bridge; Bronx - Whitestone; Throgs Neck; and Verrazano-Narrows
- *Opened to Traffic on November 15, 1931*
  1,675-foot, Steel Arch Span was the Longest in the World at the Time, and Remained so for 46 years
- *1985 Designated a National Historic Civil Engineering Landmark*
- *2001 National and NJ State Historic Register Eligible (2003 NY Eligible)*

Arch Under Construction

Arch Under Construction



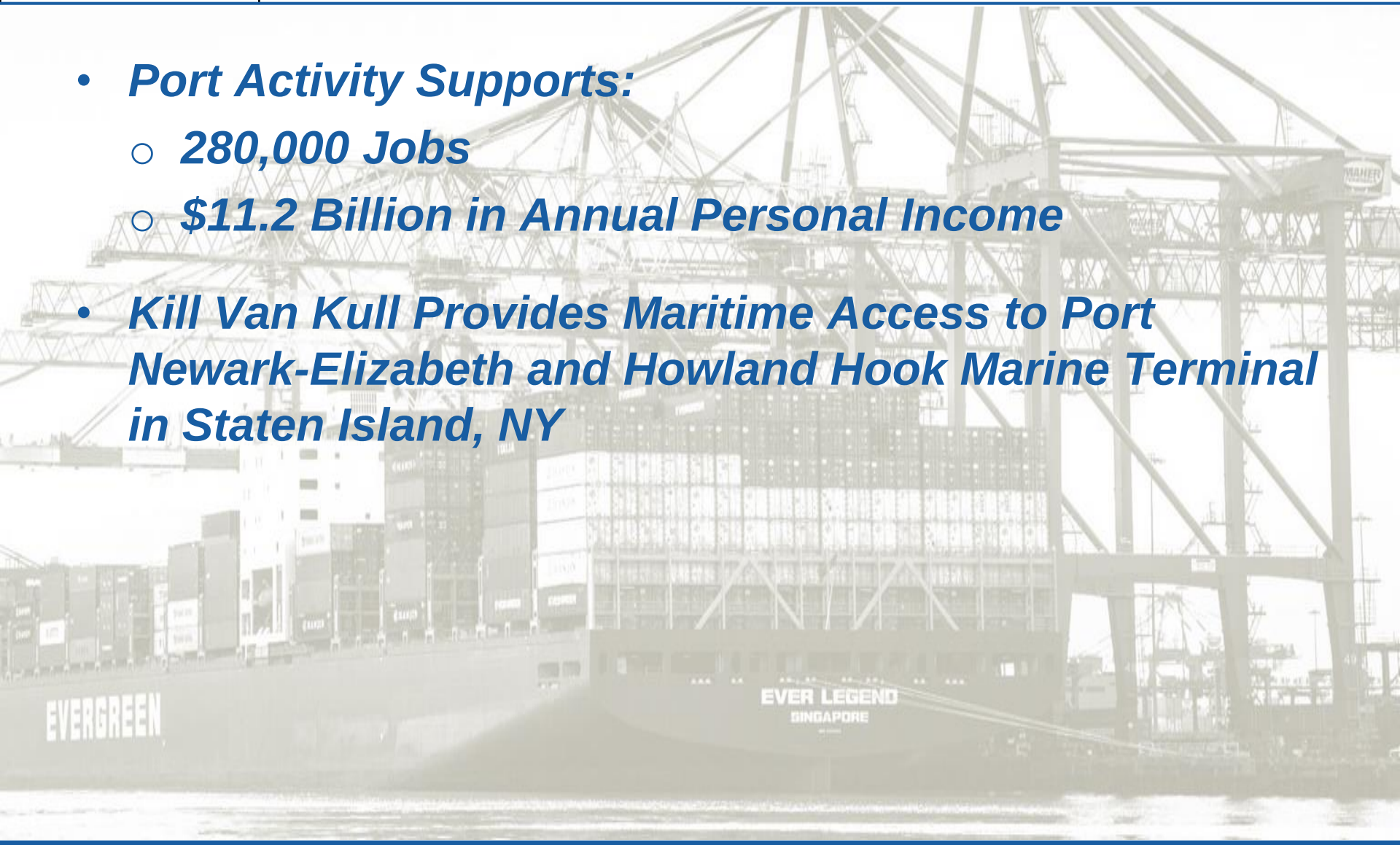
Existing Main Arch Span

The Port of New York and New Jersey

- *Busiest Port on the Eastern Seaboard - 30% of Shipping Traffic*
- *Third Largest Container Port in the Western Hemisphere, and 27th Largest in the World*
- *$202.6 Billion in Cargo Came Through the Port in 2013. Almost 80% of Imports Support Commerce in the Surrounding Region*

The Port of New York and New Jersey

- *Port Activity Supports:*
  - *280,000 Jobs*
  - *$11.2 Billion in Annual Personal Income*
- *Kill Van Kull Provides Maritime Access to Port Newark-Elizabeth and Howland Hook Marine Terminal in Staten Island, NY*

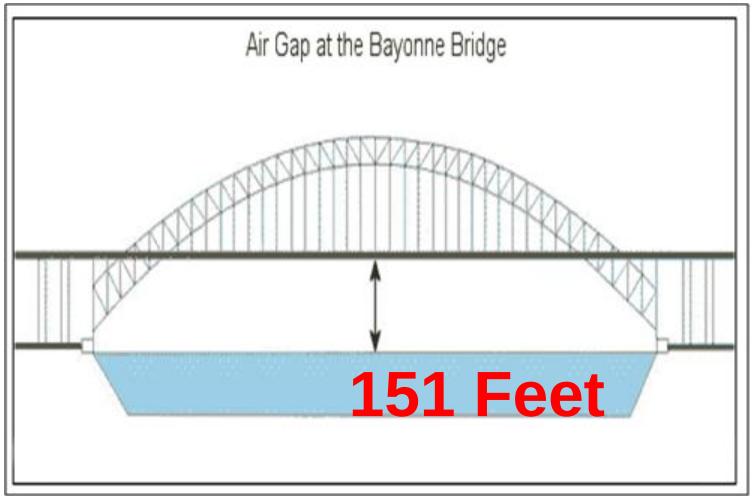


The Port of New York and New Jersey

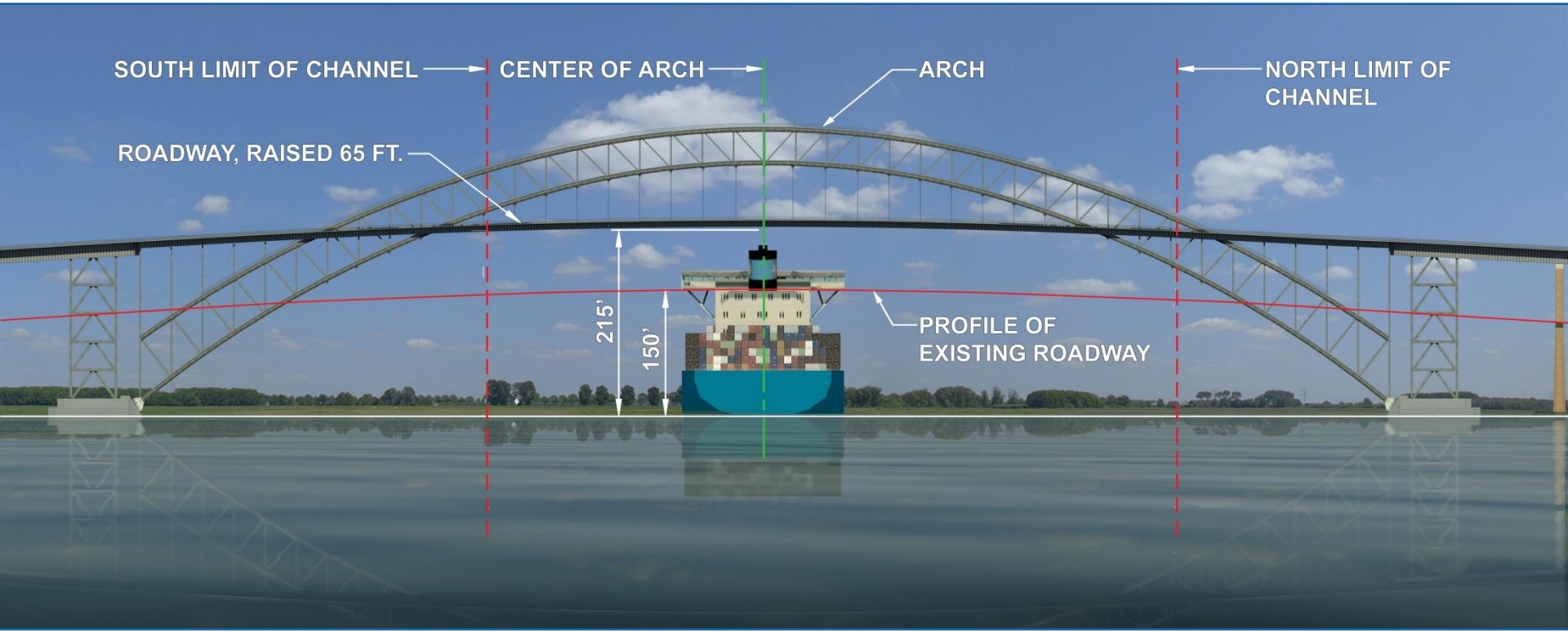
- *Economic Impact of Bayonne Bridge Construction Program*
- *6,300 Total Job Years (or Approximately 1,500 Jobs/Year)*
- *$380 Million in Wages*
- *$1.6 Billion in Regional Economic Activity*

Problem:
Bayonne Bridge Air Draft Restriction

- *Existing 151-foot Air Draft*
- *The Expansion of the Panama Canal will Allow for New, Larger, (Post-Panamax) Ships with Increased Clearance Requirements*
- *Taller Ships (up to 200-ft), will not be able to Navigate Beneath the Bayonne Bridge*
- *The Bridge of the Americas (Pacific Approach to Panama Canal), has a 201-foot Clearance*
- *Trends in Shipping (shown in photo)*
  - *8,000 TEU Regina Maersk*
  - *13,000 TEU Emma Maersk*

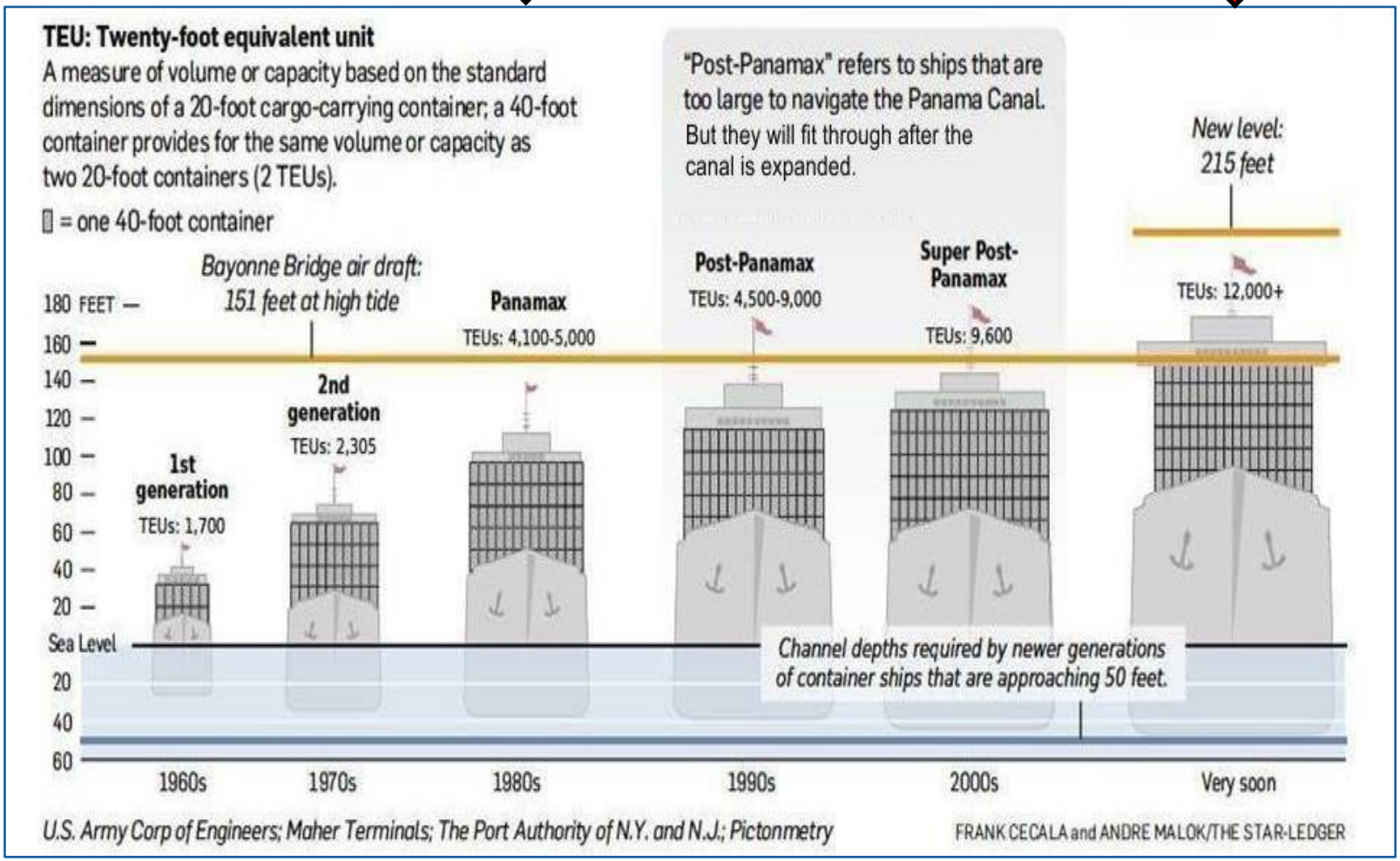


Problem:
Bayonne Bridge Air Draft Restriction



Problem:
Bayonne Bridge Air Draft Restriction

Current **Future**



Program Benefits

Freighter *Zhen Hua* Delivers Post – Panamax, 561-foot cranes to PNCT

- ***Enhance regional economic competiveness***
- ***The Bayonne Bridge Project will generate more than 2,500 construction jobs, $380 Million in wages, and more than $1.6B in regional economic activity***
- ***Increase environmental sustainability, access for newer larger ships***
- ***Modernize the roadway with wider 12-foot lanes, median divider, and shoulders***
- ***Maintenance of community character – No ROW required***
- ***Wider, full length Pedestrian Walkway / Bikeway***
- ***Potential for future Transit Access***

Alternatives Review and Analysis

BRIDGE MODIFICATIONS

- ✓ **Raise the Roadway (Retrofit or New Piers)**
- **Jack the Arch**
- **Lift Bridge**

BRIDGE REPLACEMENT

- **New Bridge**
- **New Tunnel**

NON- BRIDGE ALTERNATIVES

- **Ferry Service (Vehicular/Passenger)**
- **Remove the (Historic) Bridge**

Bayonne Bridge Alternatives Review and Analysis

Alternative	Bridge Modification			Bridge Replacement		Non-Bridge		
Criteria	**Raise the Roadway**	**Jack Arch**	**Lift Bridge**	**New Bridge**	**New Tunnel**	**Alternate Port Sites**	**Lock**	**Ferry**
Constraints/ Operational Limitations	✓	✗	✗	✓	✓	✗	✗	✗
Neighborhood / Environmental Impacts	✓	✓	✗	✗	✗	✗	✗	✗
Cost	✓	✗	✓	✗	✗	✗	-	-
Schedule	✓	✗	✗	✗	✗	✗	✗	-

"Raise the Roadway" Rehabilitation and Retrofit

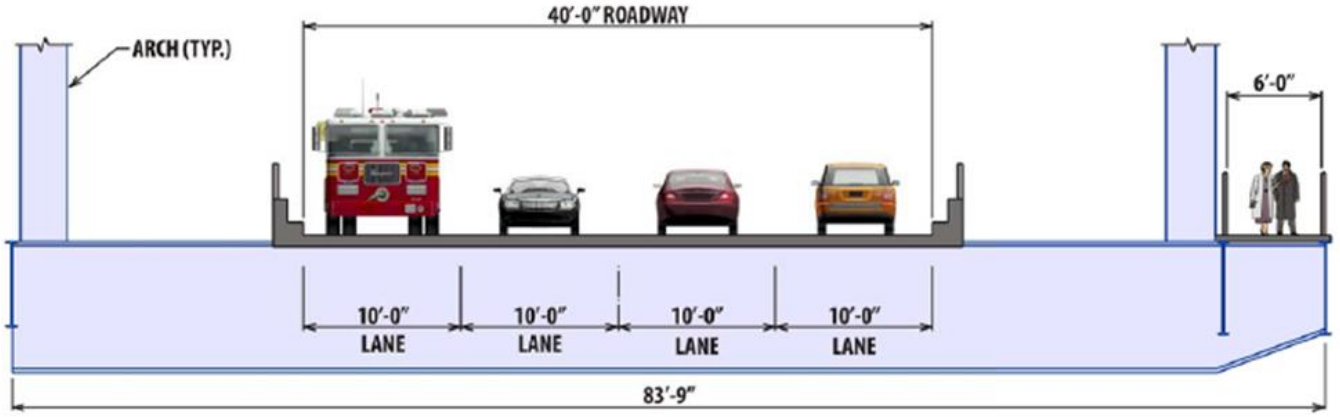
Existing

- ✓ 151 ft. air draft
- ✓ 6 ft. walkway
- ✓ 4-10 ft. lanes, no shoulders
- ✓ No median barrier

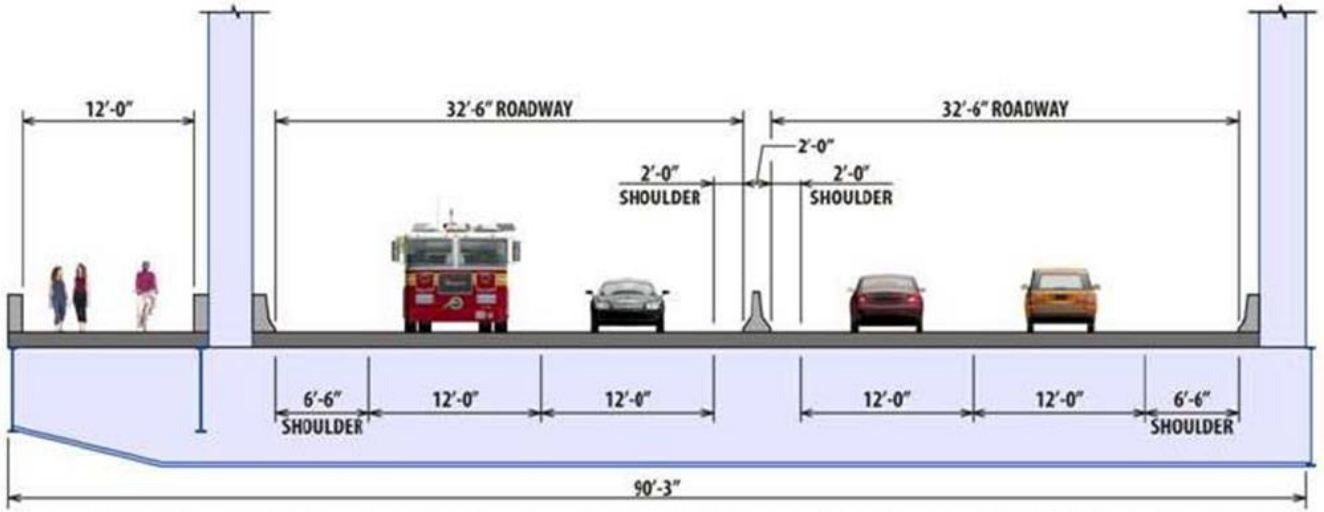
Proposed

- ✓ 215 ft. air draft
- ✓ 12 ft. walkway / bikeway
- ✓ 4-12 ft. lanes, with shoulders
- ✓ Median Barrier
- ✓ Future transit

Existing & Proposed Roadway

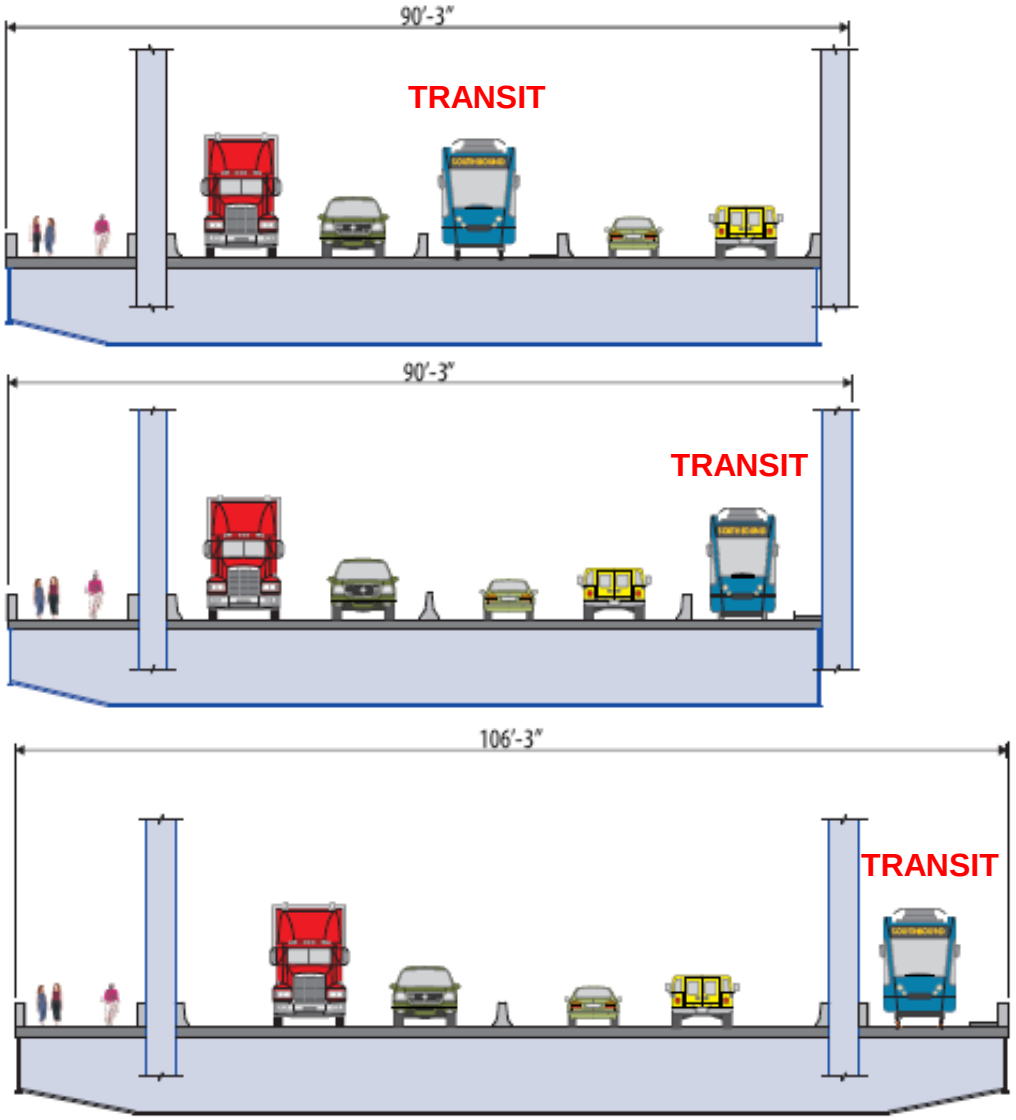


EXISTING ROADWAY (4 - 10 FOOT LANES, NO SHOULDERS, 6 FOOT WALKWAY)



PROPOSED ROADWAY (4 - 12 FOOT LANES, PARTIAL SHOULDERS, 12 FOOT WALKWAY/BIKEWAY)

Roadway Design - Future Transit Options



Bayonne Bridge Interagency Coordination & Regulatory Review Process

Approximately 50 permits from 20 different Agencies

Federal

- US Army Corp of Engineers
- US Coast Guard
- US Fish and Wildlife Service
- Marine Fisheries Service
- Amer Council on Historic Preservation
- US Environmental Protection Agency (EPA)

State of New York

- NYS Dept of Environmental Conservation
- NYS Dept of State
- NYS Dept of Transportation
- State Historic Preservation Officer (SHPO)
- Utility Relocation / Coordination

State of New Jersey

- NJ Dept of Environmental Protection
- NJ Dept of Transportation
- State Historic Preservation Officer
- Utility Coordination

Local / Municipal

- City of Bayonne
- County of Hudson
- Hudson County Sheriff's Office
- NY / NJ Elected Officials
- NYC Dept of Environmental Protection
- NYC DOB
- NYC Dept of Transportation
- NYC Transit Authority

Program Timeline

- **March 2008 –** US Army Corps of Engineers initiates National Cost Benefit Analysis (Federal Funding Potential)
- **August 2009 –** PA Initiates Conceptual Planning and Engineering
- **December 2010 –** PA selects “Raise the Roadway” Alternative
- **Nov 2011 –** Complete Preliminary Engineering Design (Joint Venture – HDR/PB)
- **August 2011 –** NEPA Environmental Review Initiated (USCG Lead Fed’l Agency)
- **April 2012 –** Contractor Pre Qualification (RTQ) Solicitation Outreach Meeting
- **July 2012 –** Announce Pre Qualified Construction Contractor Teams
- **December 2012 –** Complete Final Engineering Design
- **Q2 2013 –** Complete Environmental Review and Permits
- **Q2 2013 –** Award Bayonne Construction Contract: Skanska-Koch Kiewit
- **2016 – Remove Navigational Clearance Obstruction**
- **2018 – Complete Construction**

Environmental, Regulatory, and Community Issues - Overview

Traffic - Roadway Closures - Parking

Hazardous Materials

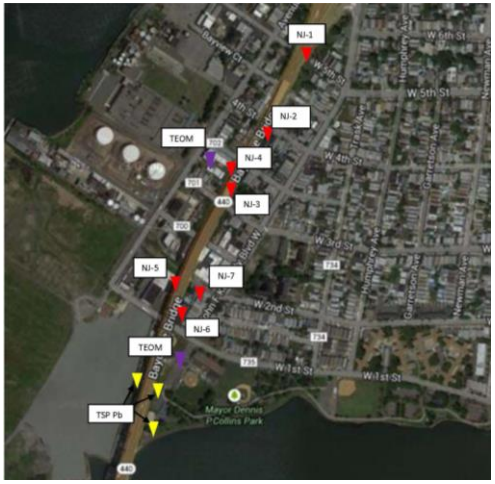
- 1st Street (Williams Industries) Site Remediation

Noise *

- Compliance with Noise Code (day; night; weekend limits)

Air Quality *

- 3 Tiered Dust / Air Monitoring Program –
  - ✓ Regional Air Quality,
  - ✓ Areas with Known Contaminants (Lead/Arsenic),
  - ✓ Perimeter Monitoring
- Dust Trackers
- Real Time Investigation and Incident Reports



Community Assistance Program

- Window Replacement Program
- Temporary Hotel Program

NY / NJ Outreach Office / 800 Hot Line

* Air and noise monitoring exceeds all Federal requirements

Alternatives Reviews and Analysis - Arch

41 Options Considered Including:

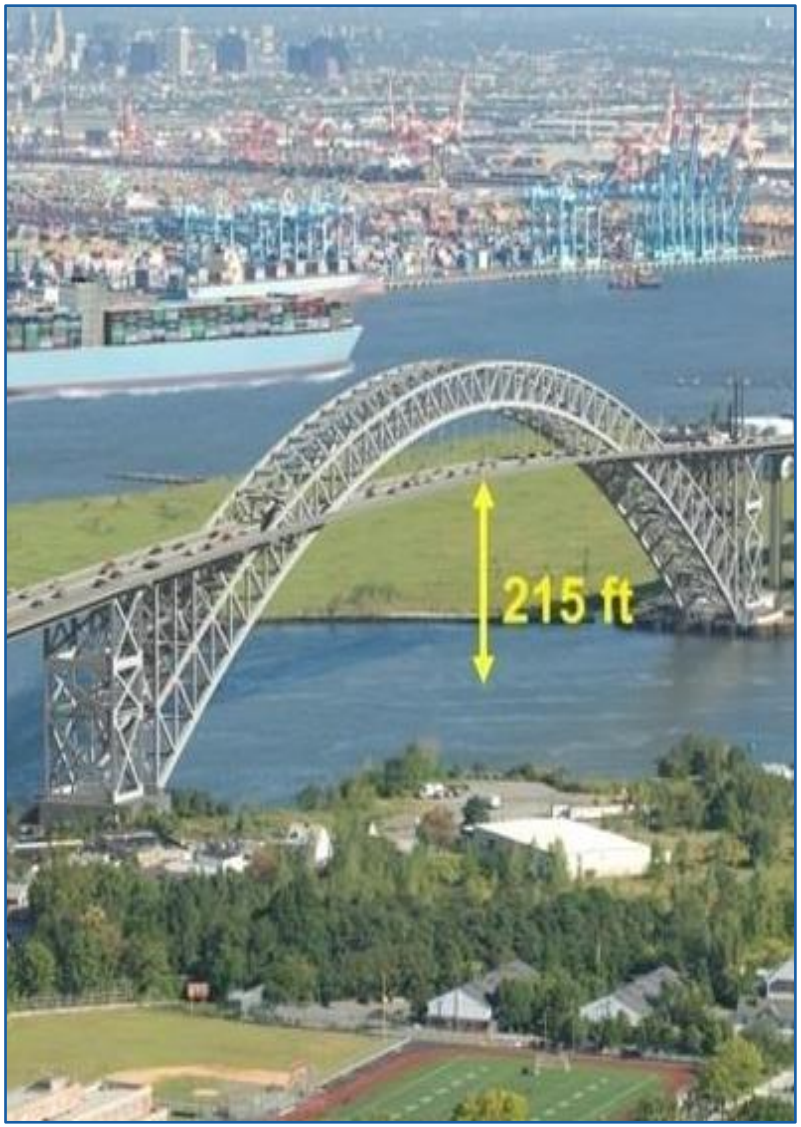
- Raise the Roadway
- Jack the Arch
- New Bridge
- New Tunnel
- Ferry Service (Vehicular/Passenger)
- Remove the (Historic) Bridge

JACK THE ARCH OPTION

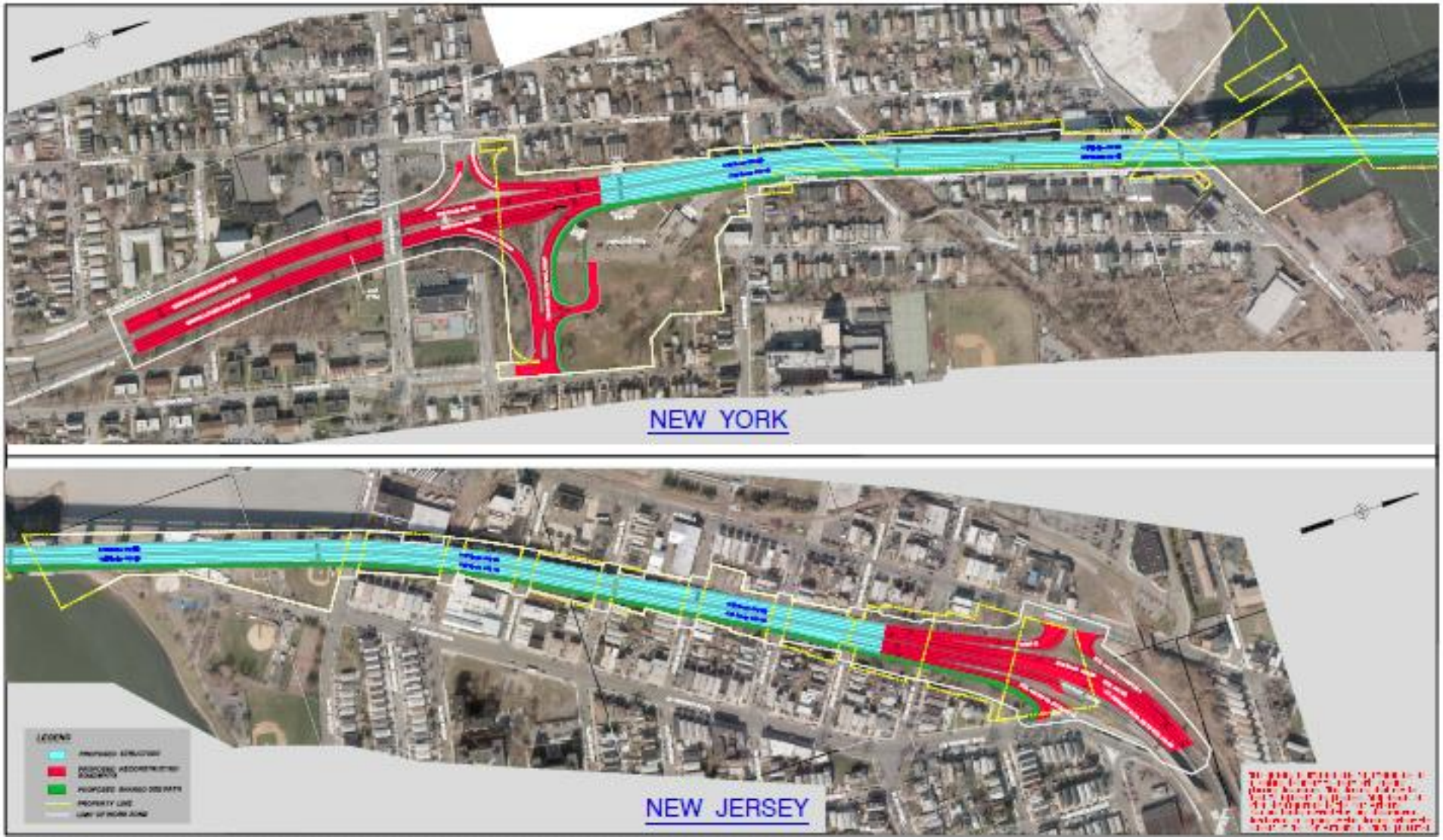
Alternatives Review and Analysis - Arch

New Bridge Option

Raise the Roadway
Rehabilitate, Retrofit, and Reuse - Arch



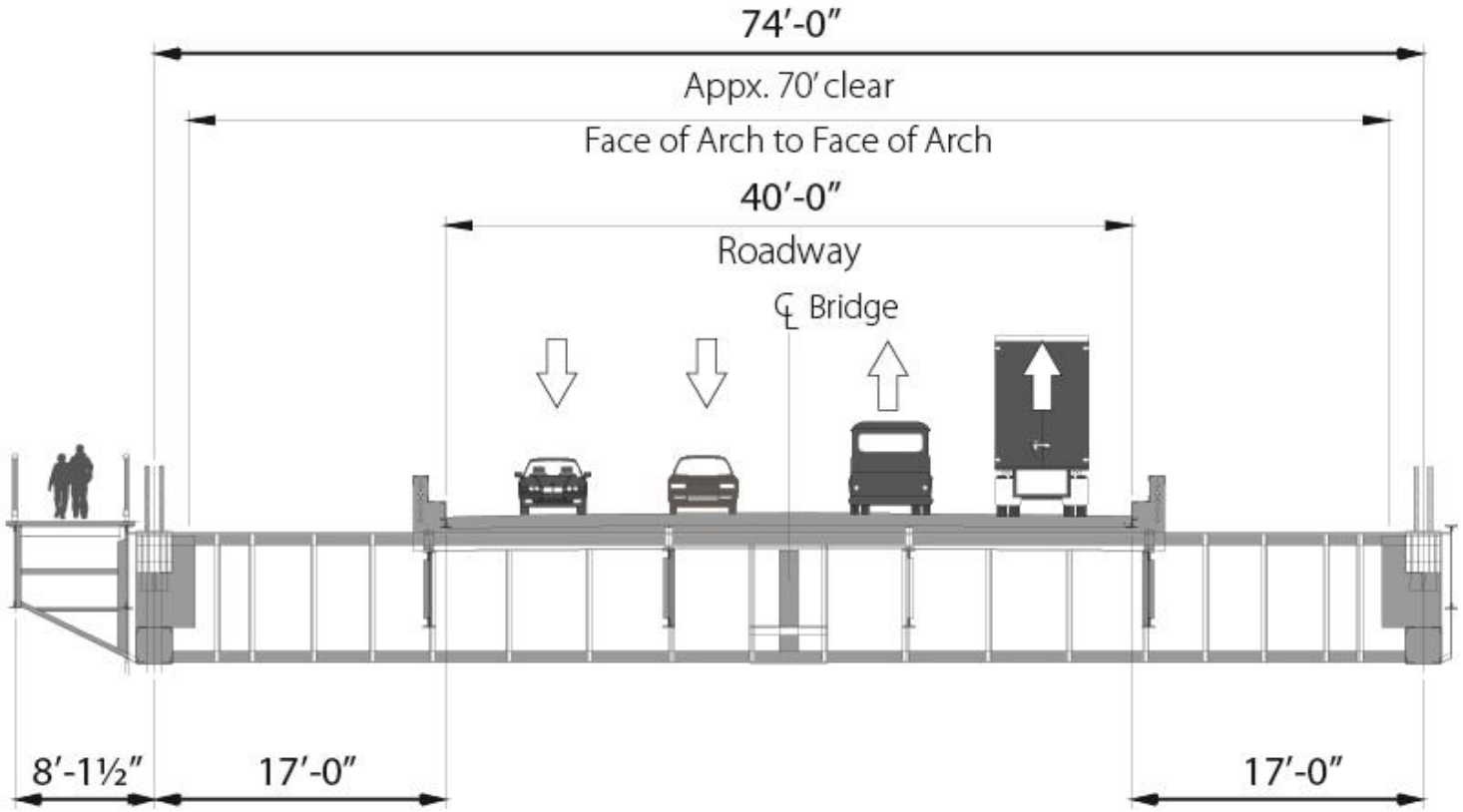
Construction Work Zone Overview



Construction Staging – Main Span

Arch Span – Existing
View Looking North

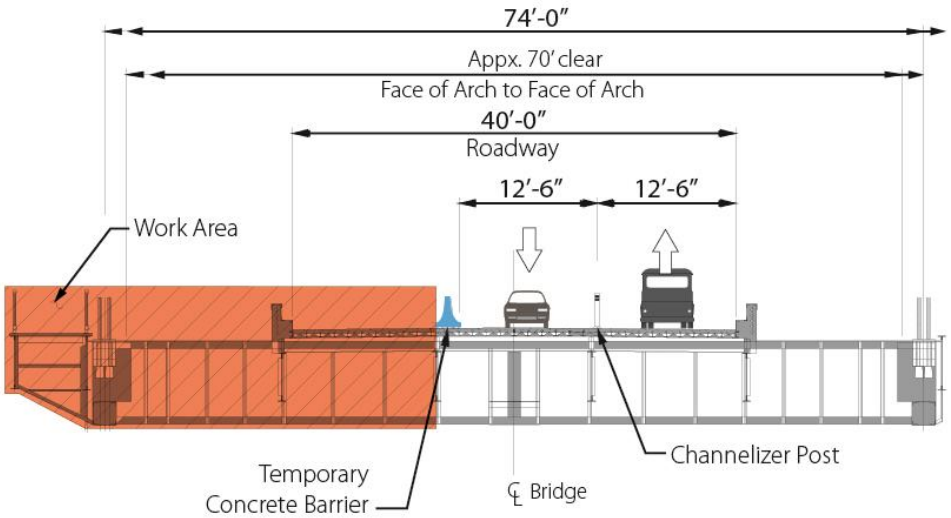
Demolition/Prep
Construction



Construction Staging – Main Span

Arch Span - Stage 1 (Adjusted by Contractor)
View Looking North

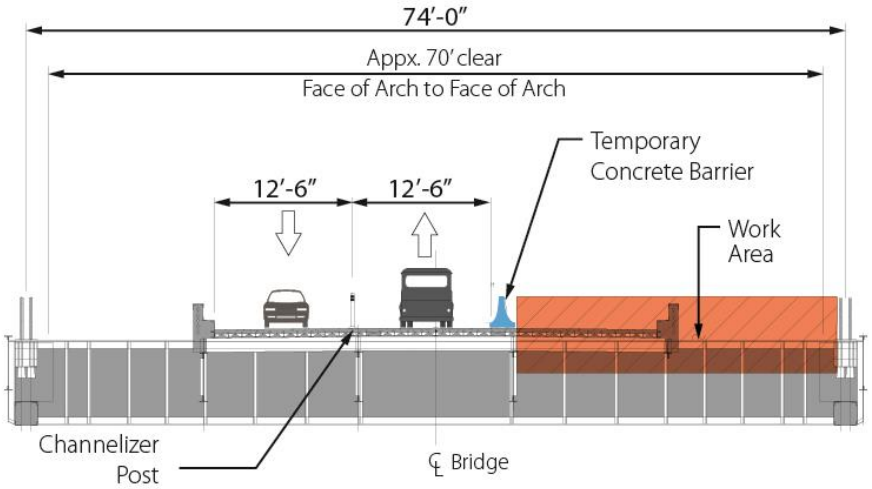
Demolition/Prep
Construction



Construction Staging – Main Span

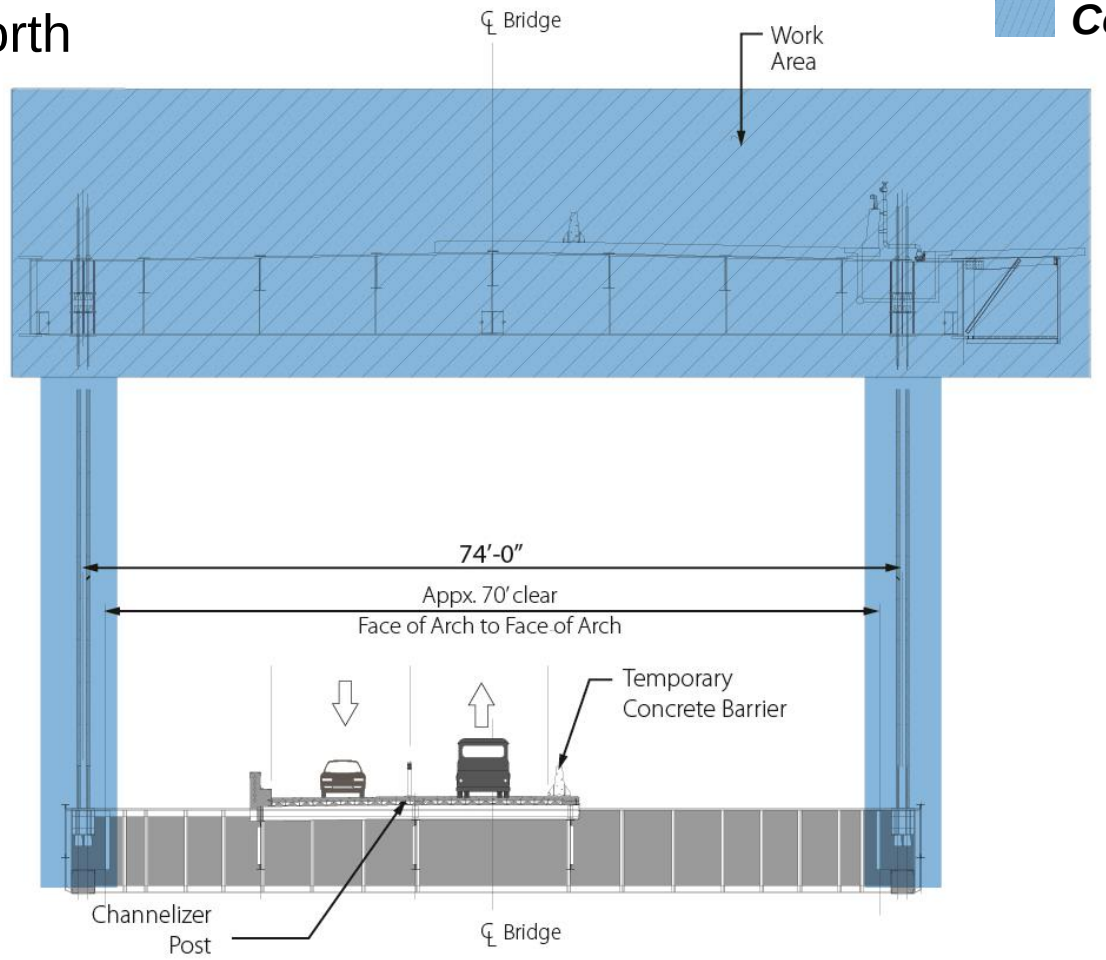
Arch Span - Stage 2
View Looking North

Demolition/Prep
Construction



Construction Staging – Main Span

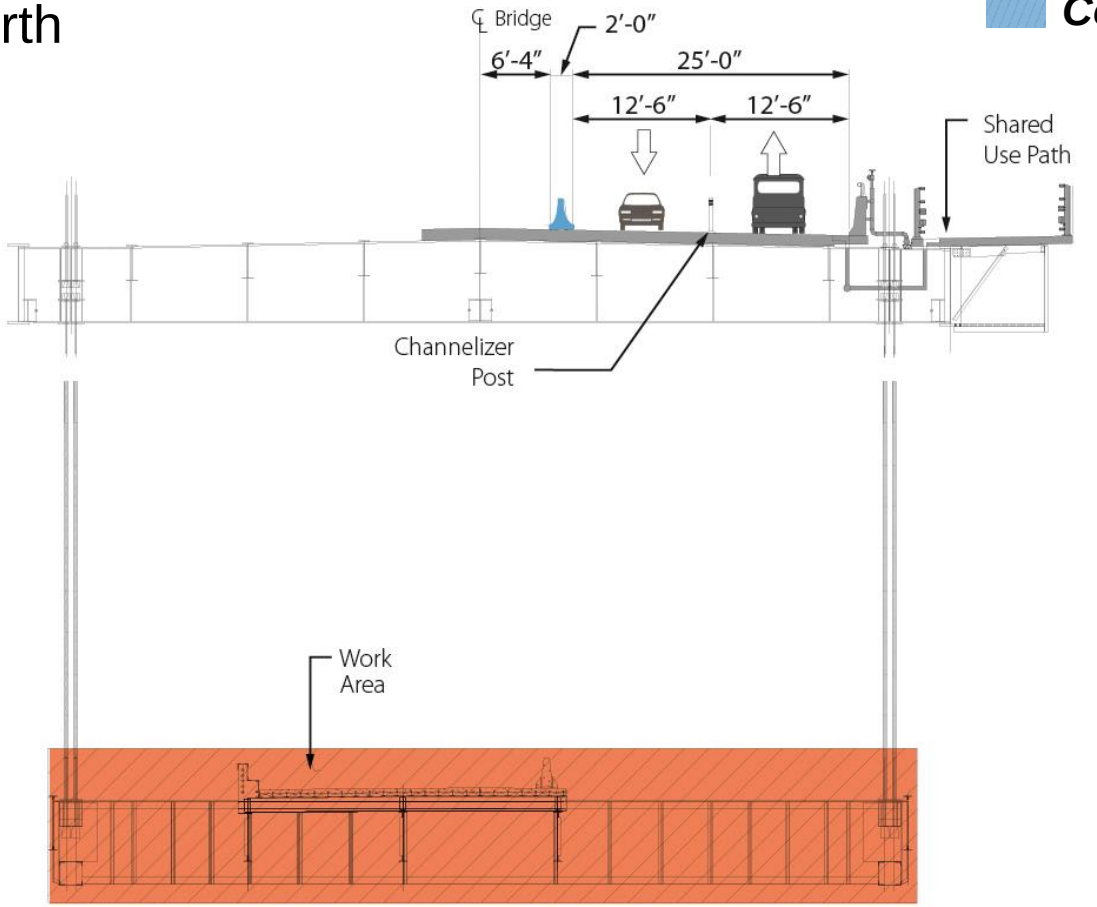
Arch Span - Stage 3
View Looking North



Construction Staging – Main Span

Arch Span - Stage 4
View Looking North

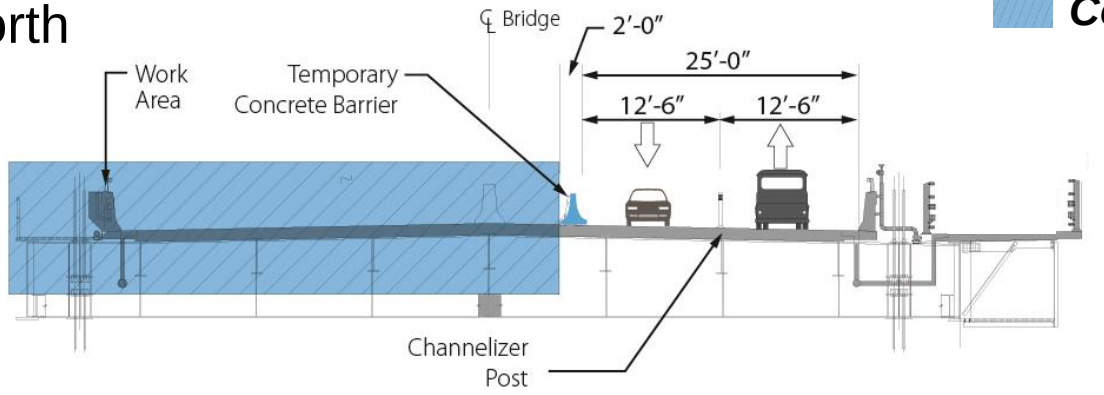
Demolition/Prep
Construction



Construction Staging – Main Span

Arch Span - Stage 5
View Looking North

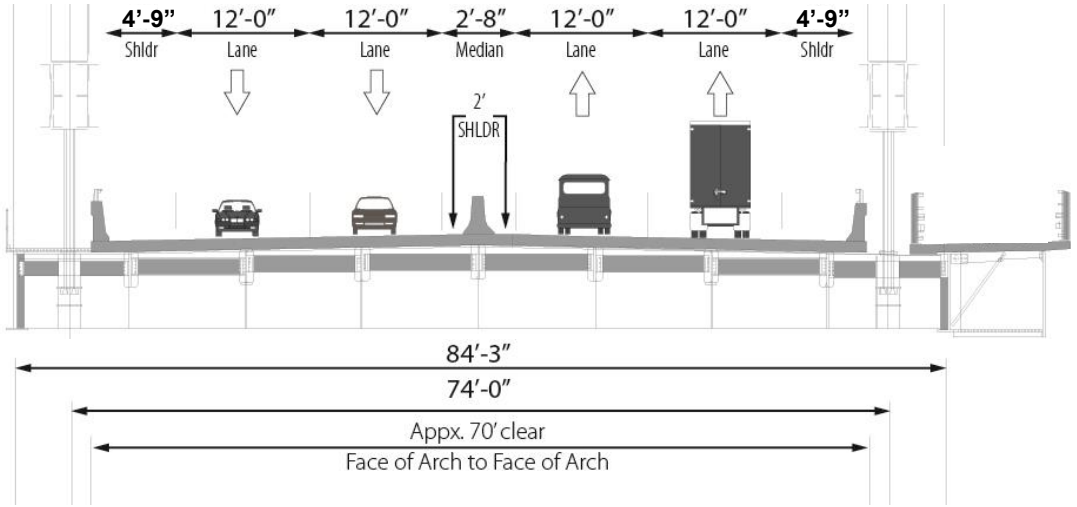
Demolition/Prep
Construction



Construction Staging – Main Span

Demolition/Prep

Construction

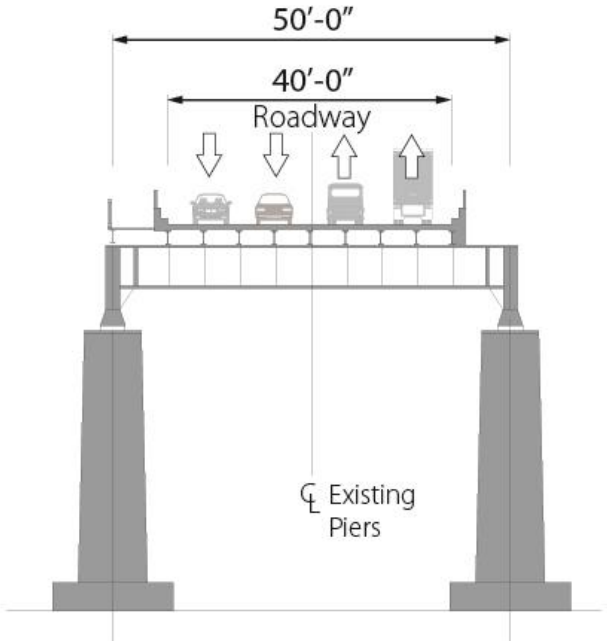


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
View Looking North

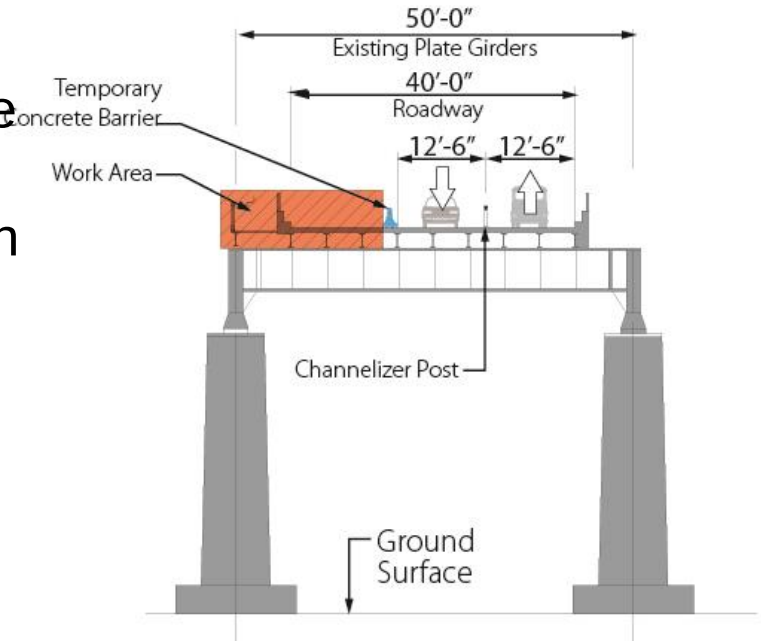


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Stage 1
View Looking North

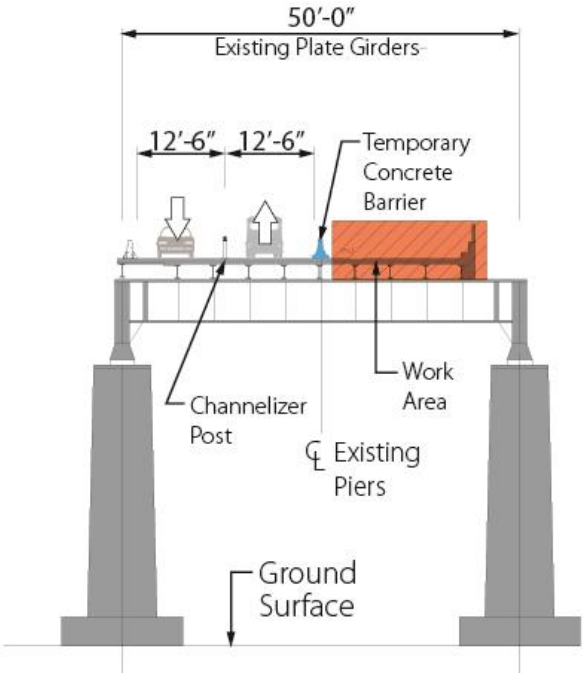


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Stage 2
View Looking North

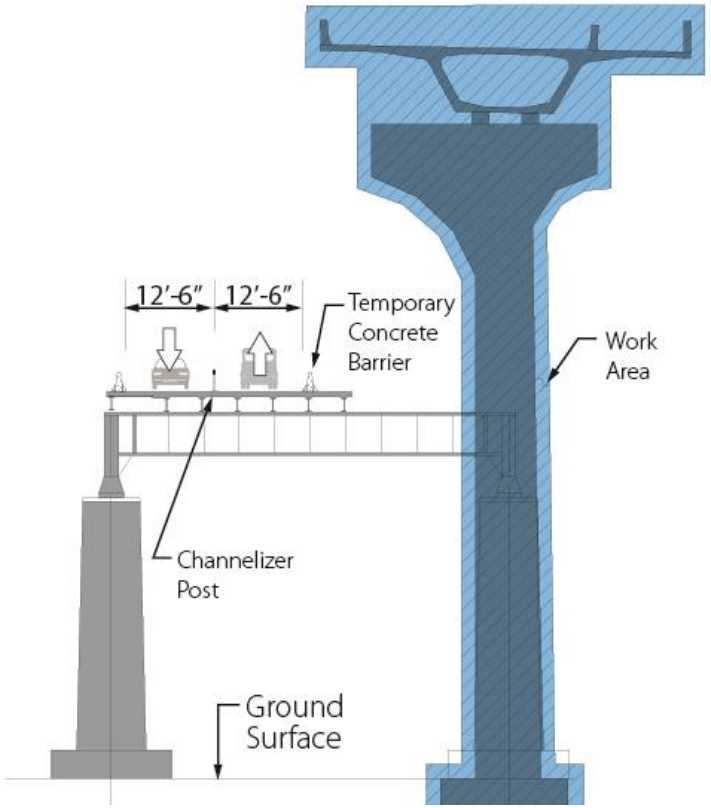


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Stage 3
View Looking North

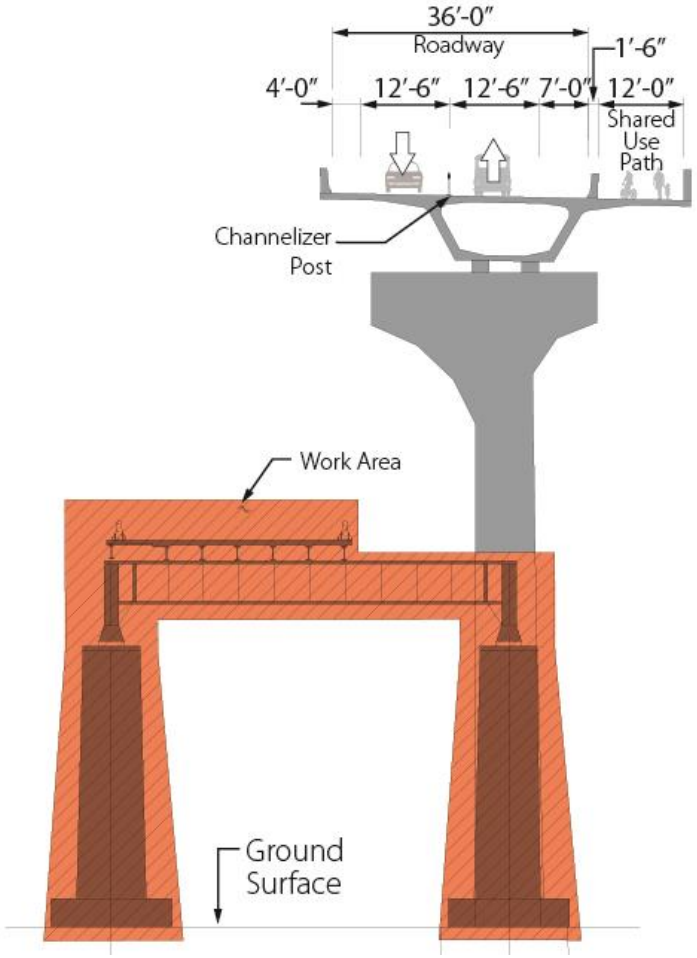


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Stage 4
View Looking North

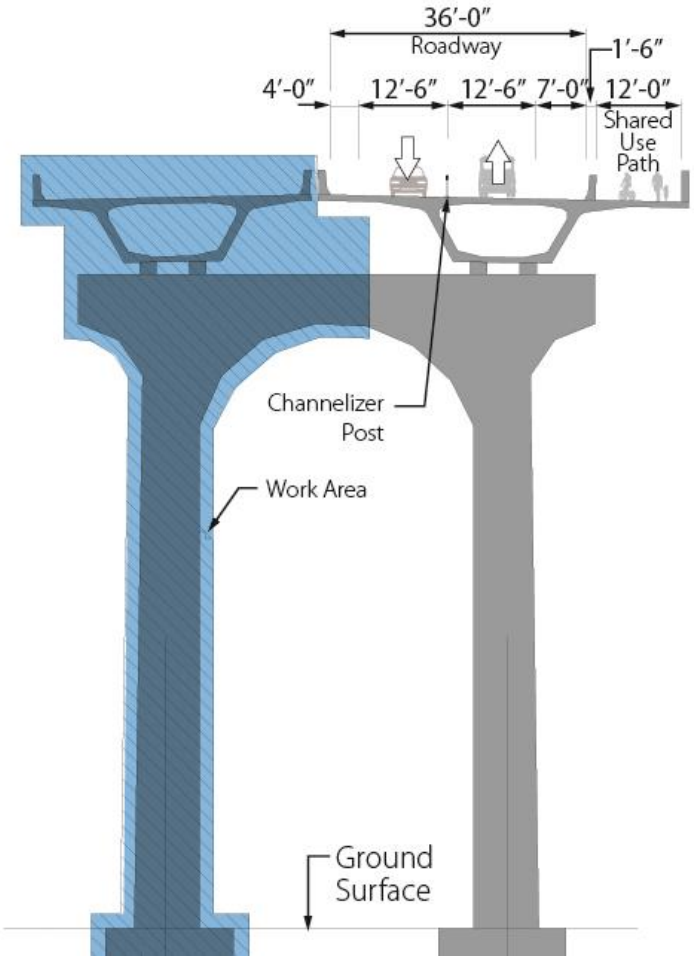


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Stage 5
View Looking North

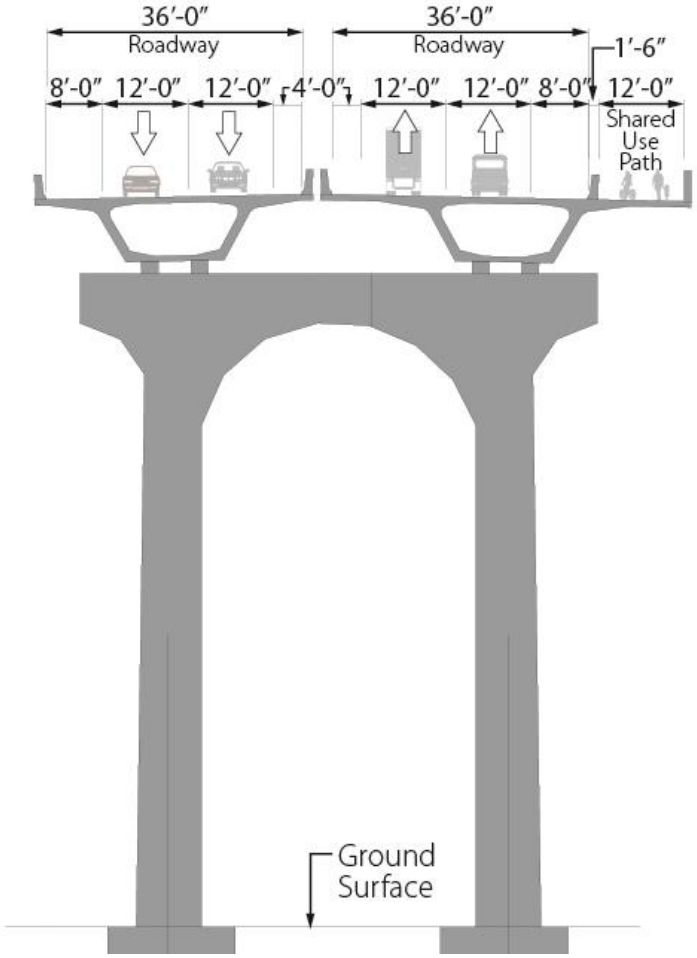


Construction Staging – Approach Structure

Demolition/Prep

Construction

Approach Structure
Final
View Looking North

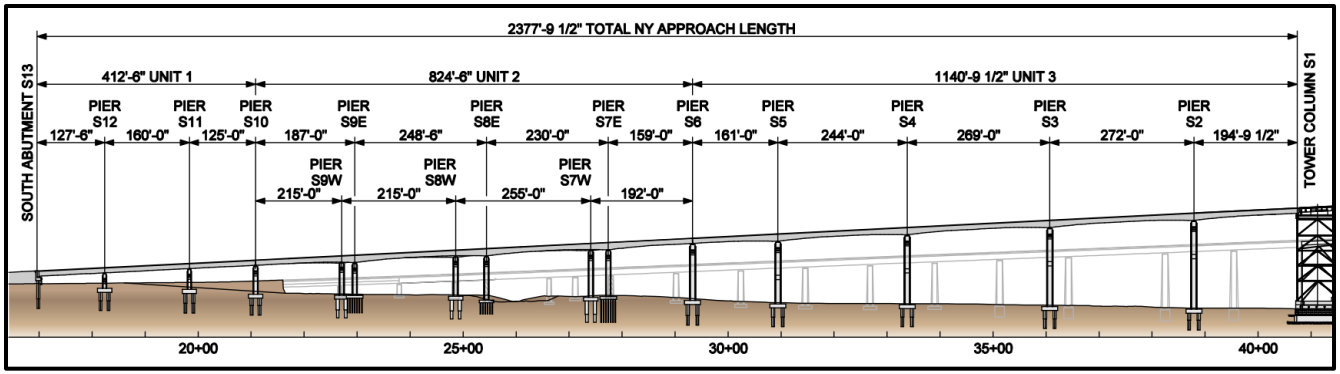


02

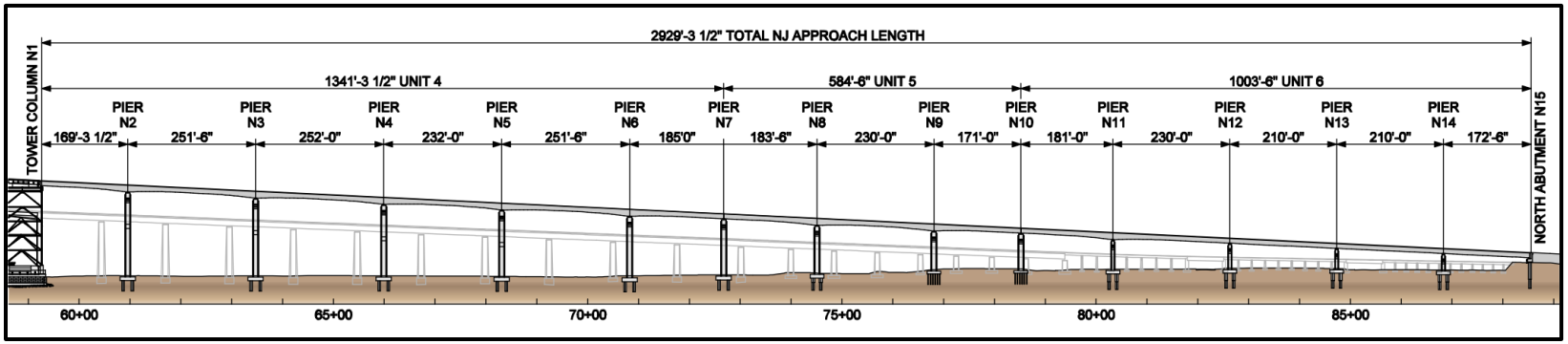
The Project

Approach Structures: Articulation/Pier Fixity

New York (12 spans, 272’ max, 125’ min)

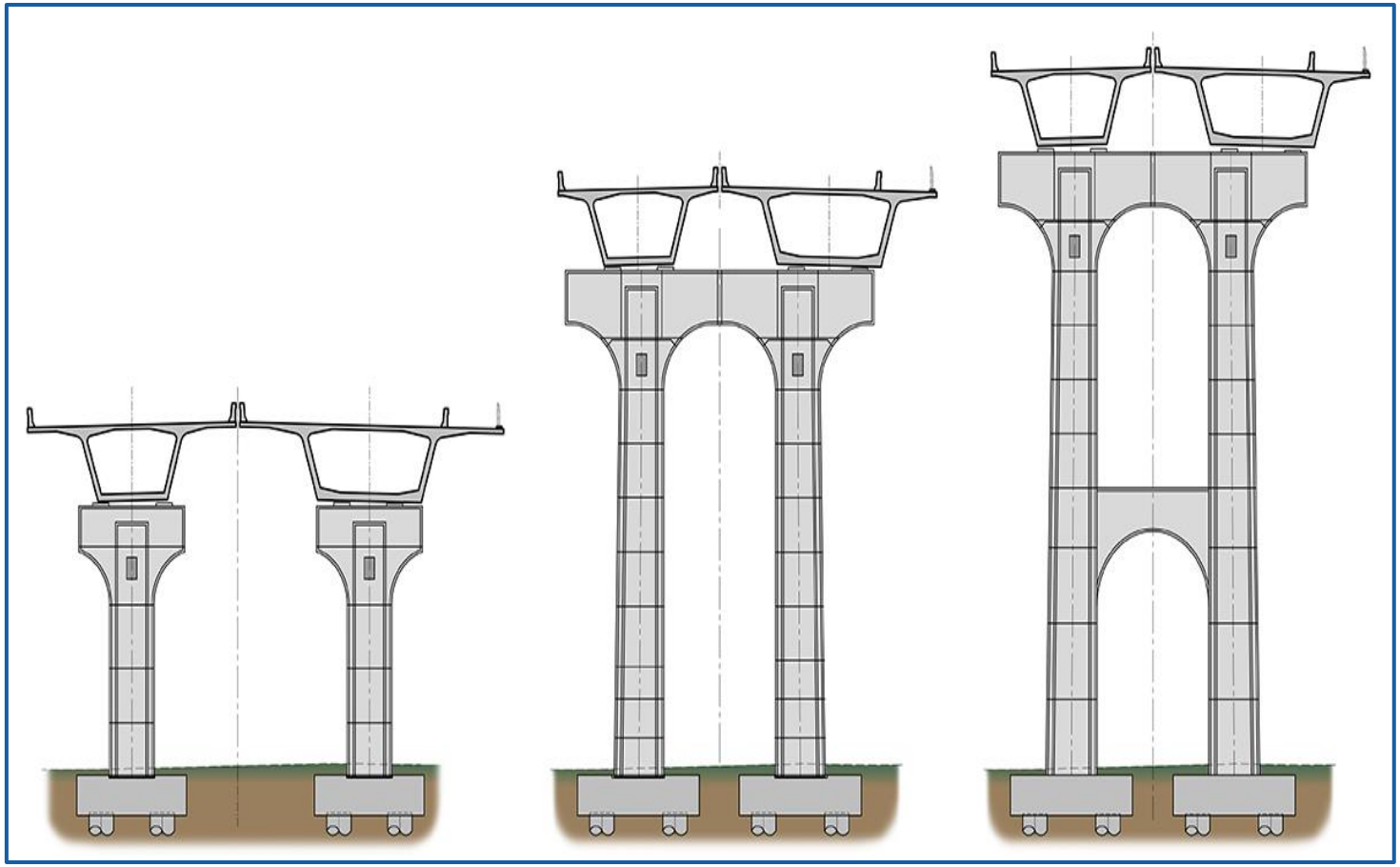


New Jersey (14 spans, 252’ max, 171’ min)



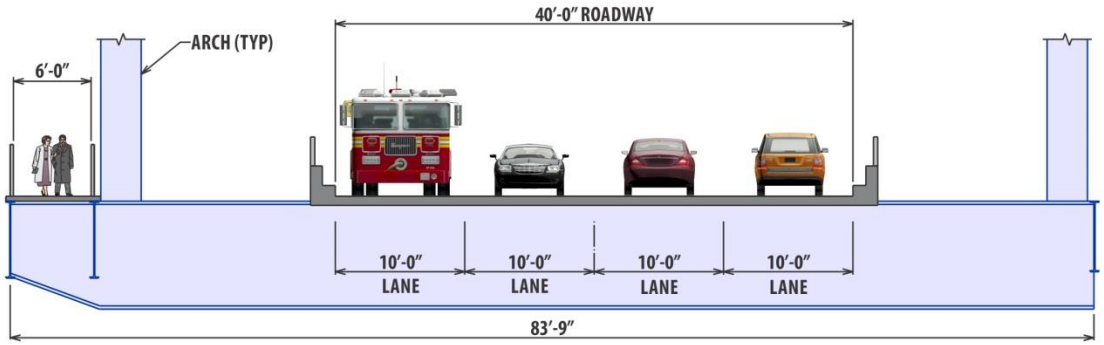
Full Replacement of Approach Structures

Approach Structures: Piers

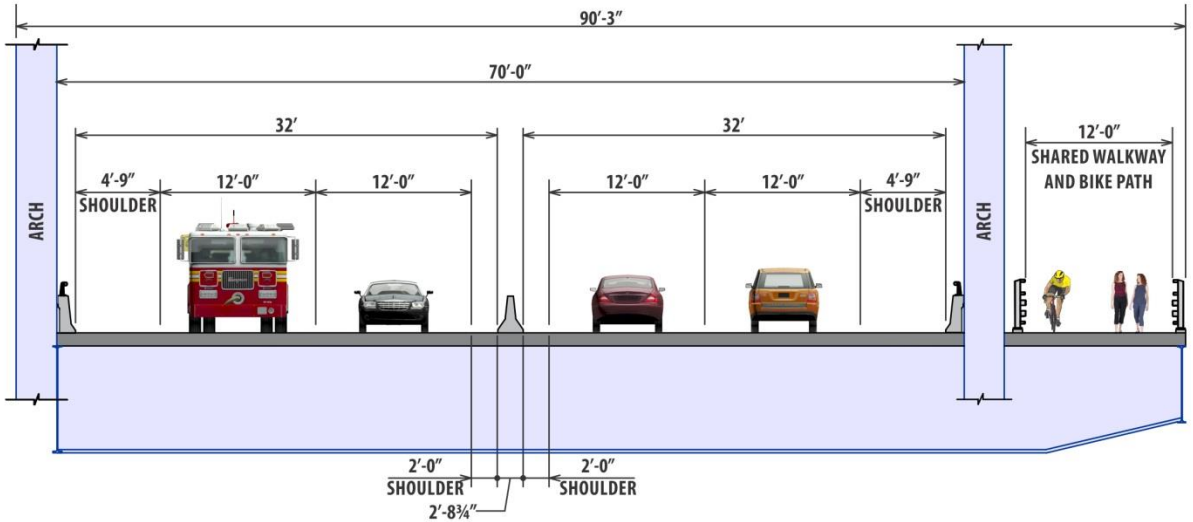


Single Pier Combined Pier Tall Pier

Main Span Roadway Looking North

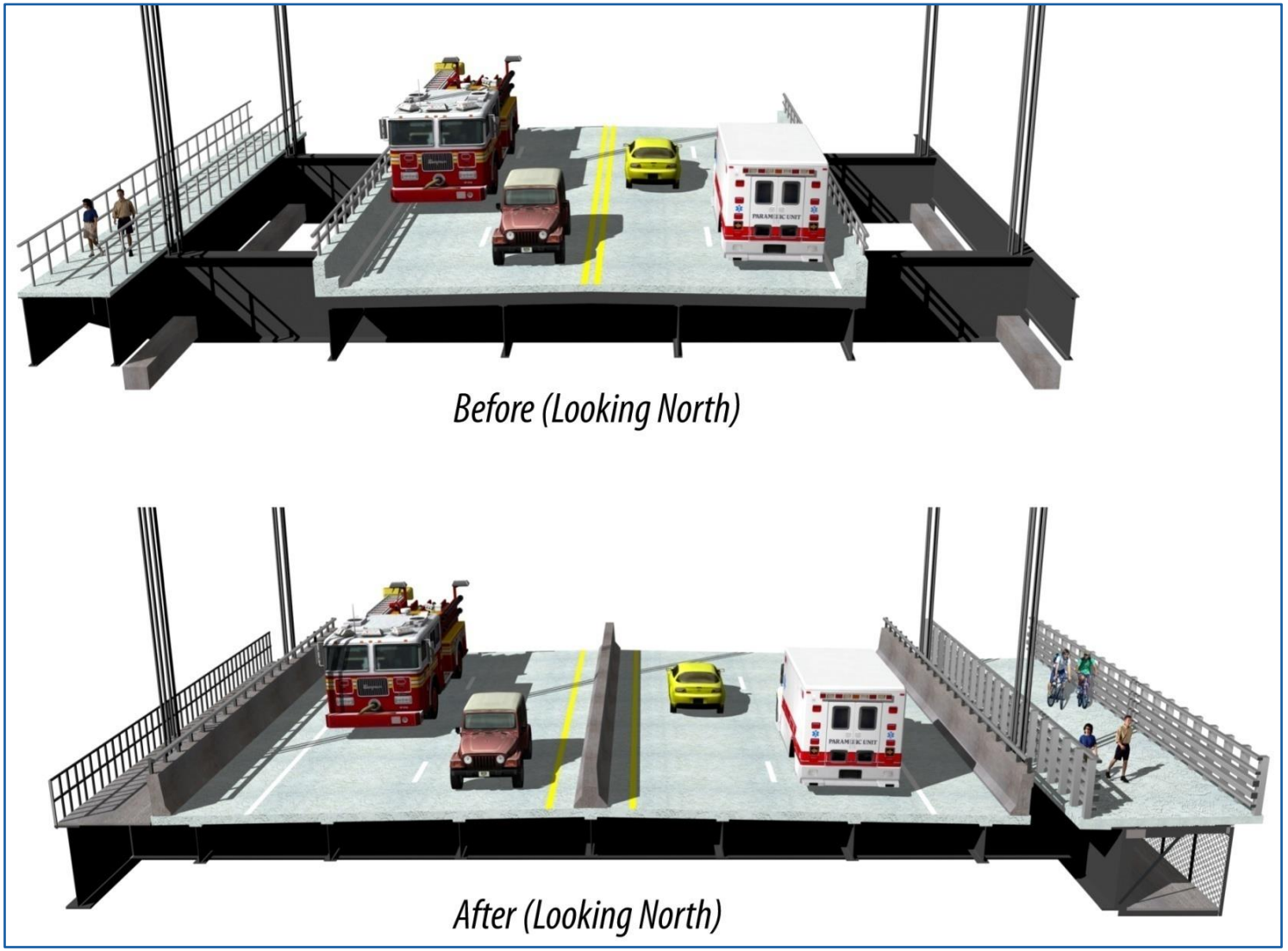


EXISTING ROADWAY (4 - 10 FOOT LANES, NO SHOULDERS, 6 FOOT WALKWAY)



PROPOSED ROADWAY (4 - 12 FOOT LANES, PARTIAL SHOULDERS, 12 FOOT WALKWAY/BIKEWAY)

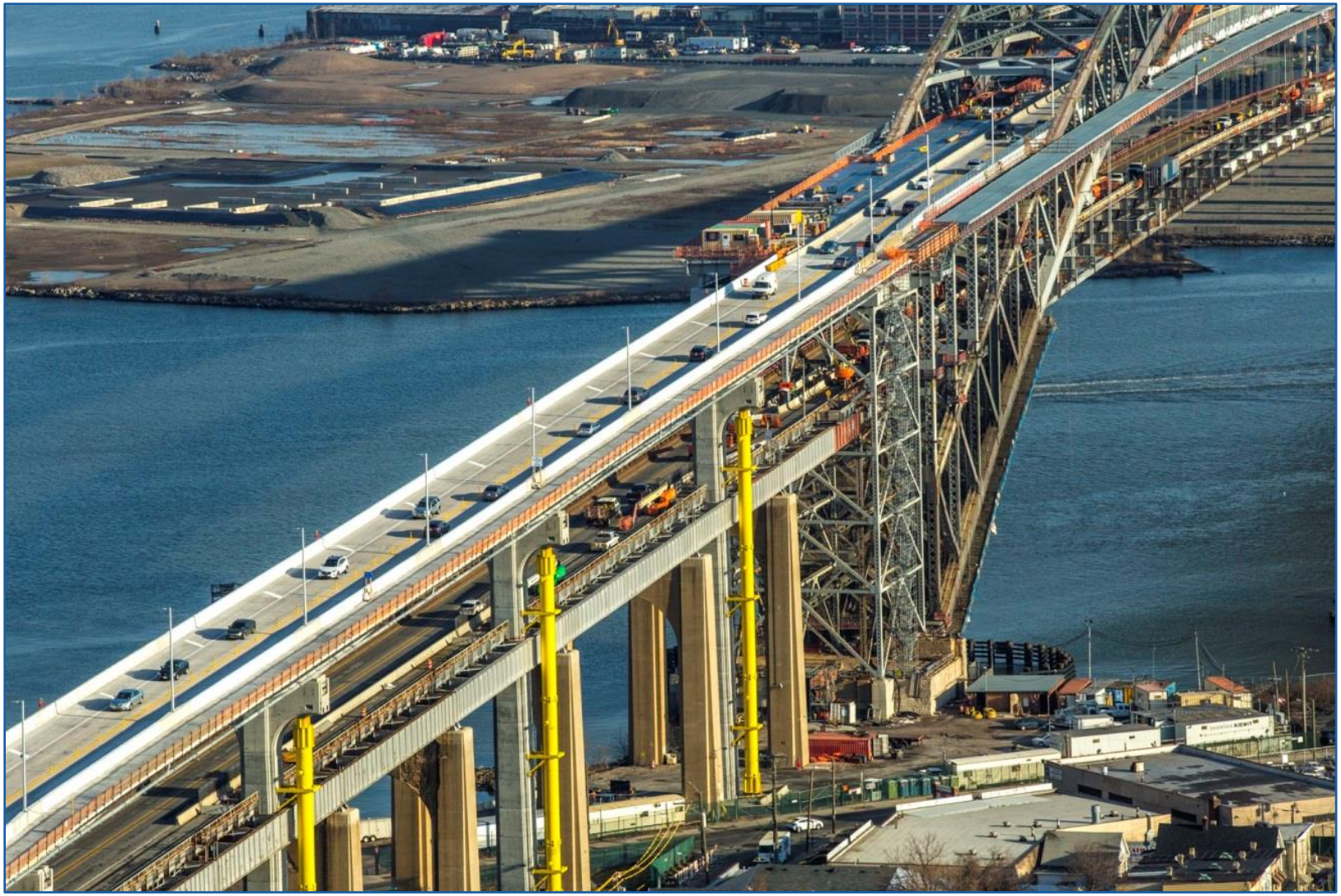
Existing & New Arch Floor System



Before (Looking North)

After (Looking North)

Construction Status:
NB Lanes (2) Opened February 2017



Construction

September 7, 2017
14,400 TEUs vs. 5,000 TEUs

Vessel Height at 185 feet (actual)

The End