

New Jersey Department of Transportation

Accelerated Superstructure Replacement of the Route 139 Hoboken Viaduct

Hudson County, NJ



**ABCD Susquehanna Chapter
2018 Technical Conference**

September 6, 2018

Presentation Overview

- Project Background
- Project Location
- Existing Roadway Features
- Existing Structural Features
- Purpose and Need
- Initial Design Concept
- Revised (ABC) Design Concept
- Advantages of ABC Concept



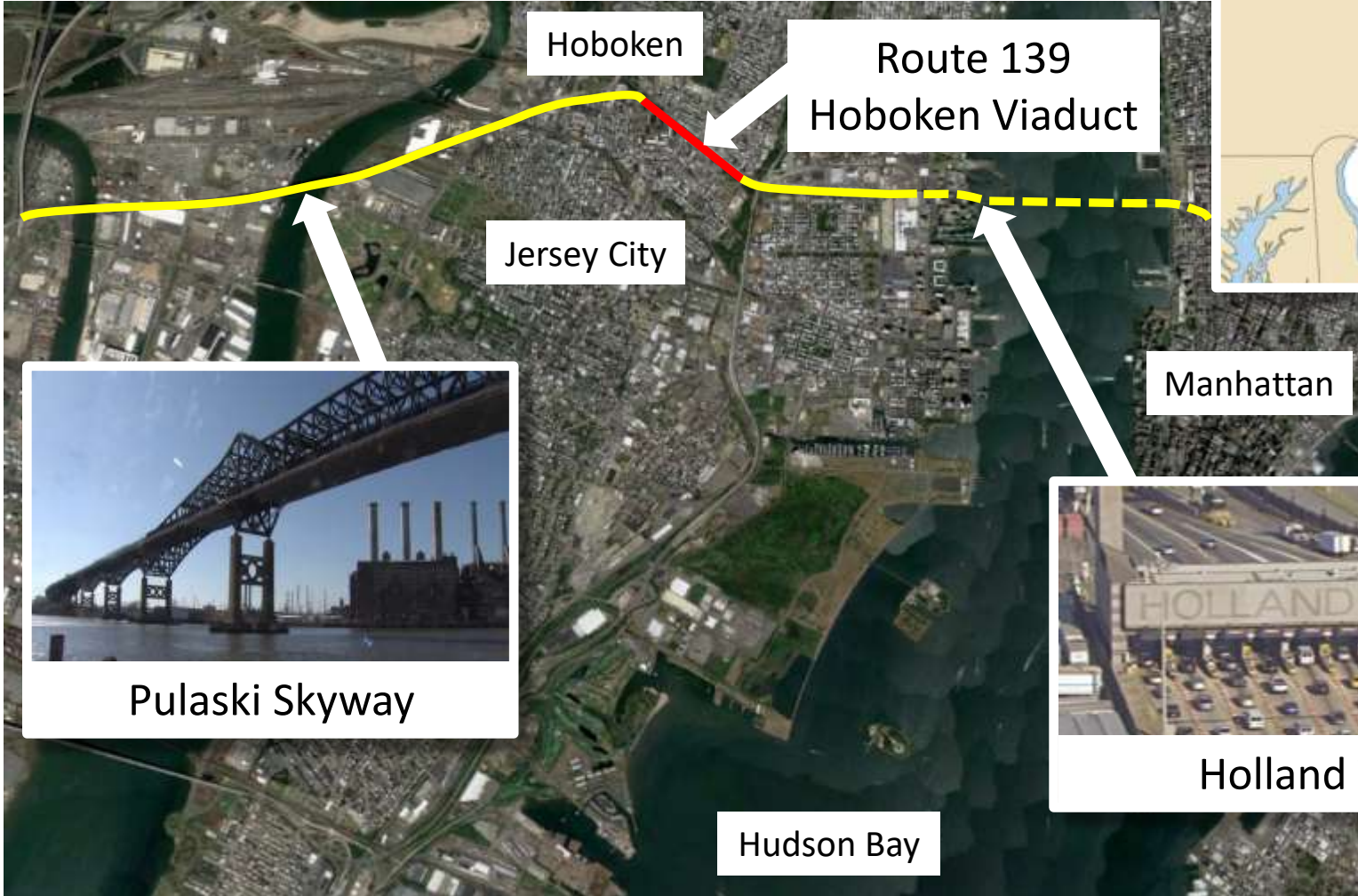
Project Background

- Design Team
 - ✓ Owner: New Jersey Department of Transportation
 - ✓ Prime Consultant: DMJM/Harris - AECOM (Conrail Viaduct)
 - ✓ Major Subconsultant: Gannett Fleming (Hoboken Viaduct)

- Ongoing Project since 1996

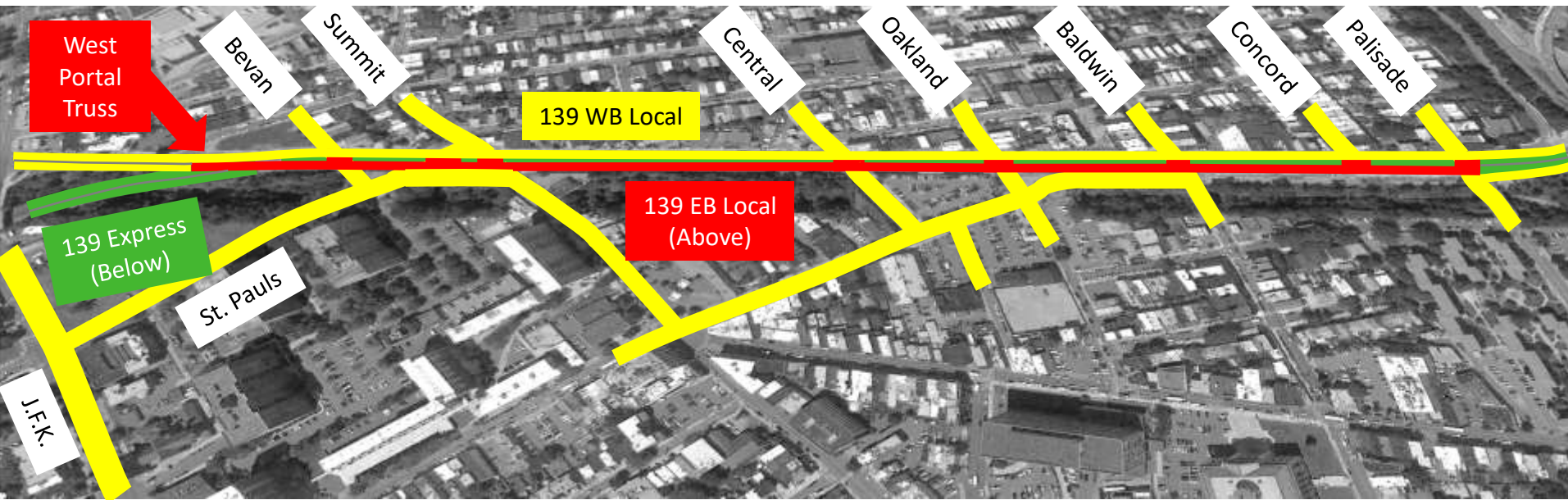
- Gannett Fleming's Role
 - ✓ Inspection of the Hoboken Viaduct
 - ✓ Floorbeam Ratings
 - ✓ Preliminary / Final Design Services for Structure Rehabilitation
 - ✓ Drainage Design / Improvements
 - ✓ Construction Support Services

Project Location

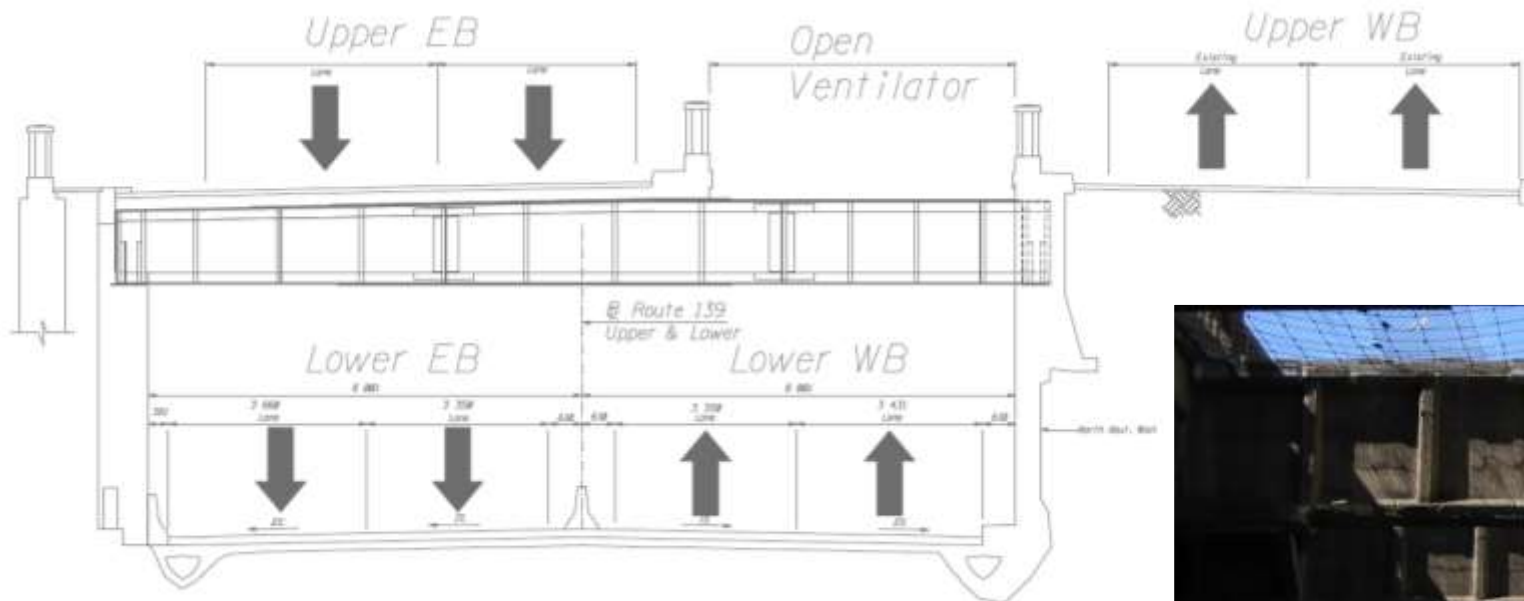


Existing Roadway Features

- Constructed in 1926 (Route 1 Extension)
- 3,200 LF Cut and Cover Structure
- Express Roadway (Below Structure)
- Local Roadway (EB on Structure / WB Behind North Abutment Wall)
- Accommodates Eight Cross Streets



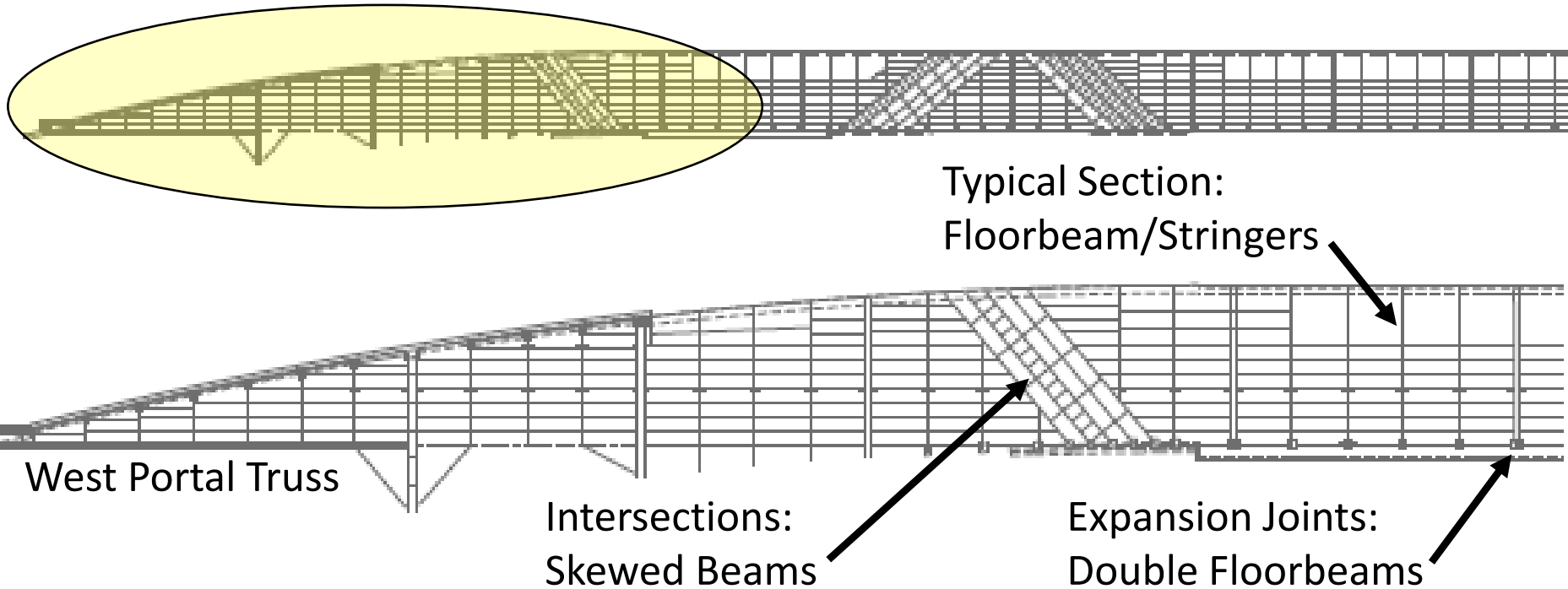
Existing Roadway Features



Existing Lane Configuration

- 2 Lanes – WB & EB Express (Lower)
- 2 Lanes – Upper WB Local (Behind North Abutment)
- Open Area (Ventilation)
- 2 Lanes – Upper EB Local (On Structure)

Existing Structural Features – Superstructure

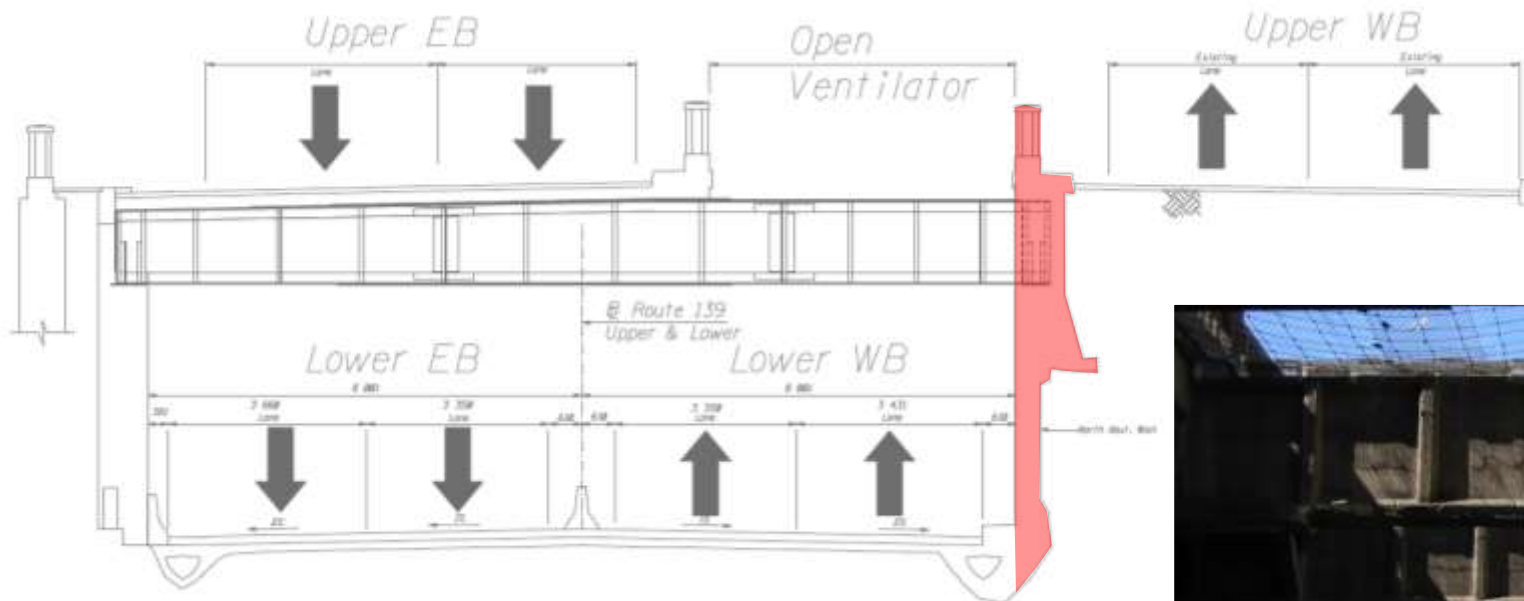


Existing Structural Features – Superstructure

- 185 Spans and 8 Cross Street Bridges
- Concrete Deck and Balustrades
- Floorbeam/Stringer System
- Built-up Steel Sections (Riveted)
- Concrete Encased Steel
- Open Ventilator Regions



Existing Structural Features – Substructure

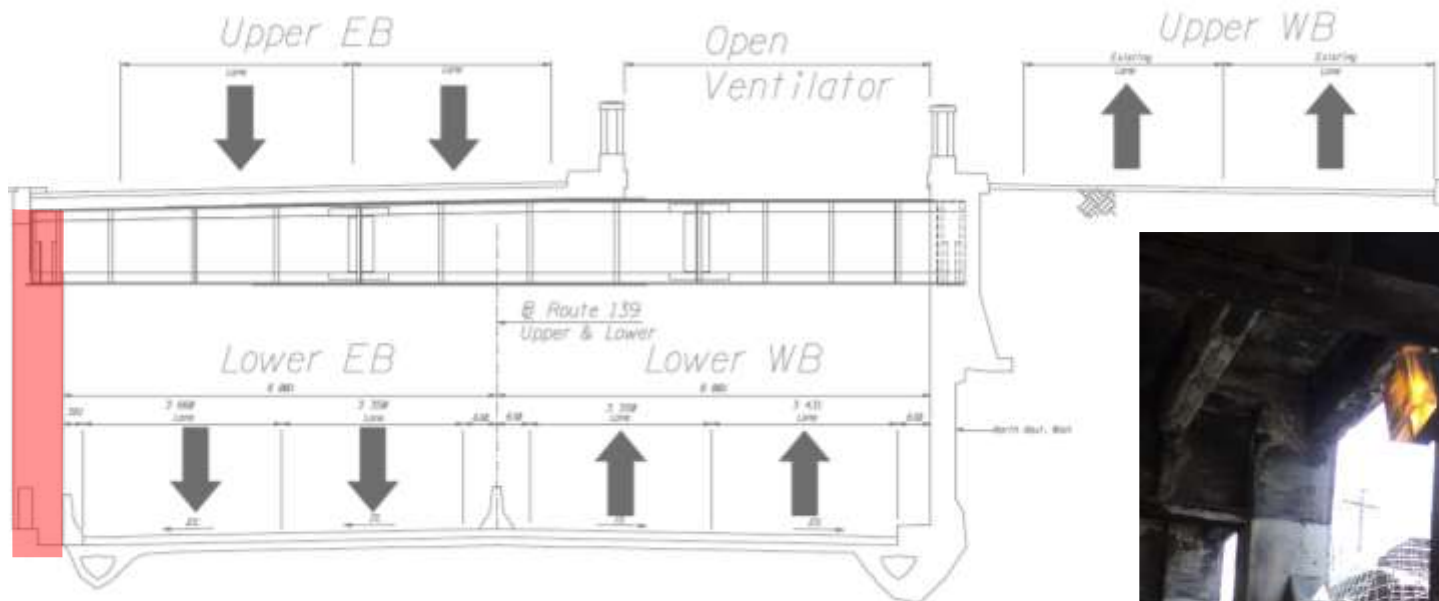


North Substructure

- Concrete Gravity Wall Abutment
- Continuous Along Length of Cut & Cover Section



Existing Structural Features – Substructure



South Substructure

- Individual Columns (Typical Section)
- Concrete Gravity Wall Abutments (Cross Streets)



Purpose and Need

- Eliminate Structural Deficiencies
 - ✓ Deck Replacement
 - ✓ Live Load Capacity Improvement
 - ✓ Substructure Repair
- Improve Upper Roadway Geometrics



Initial Design Concept

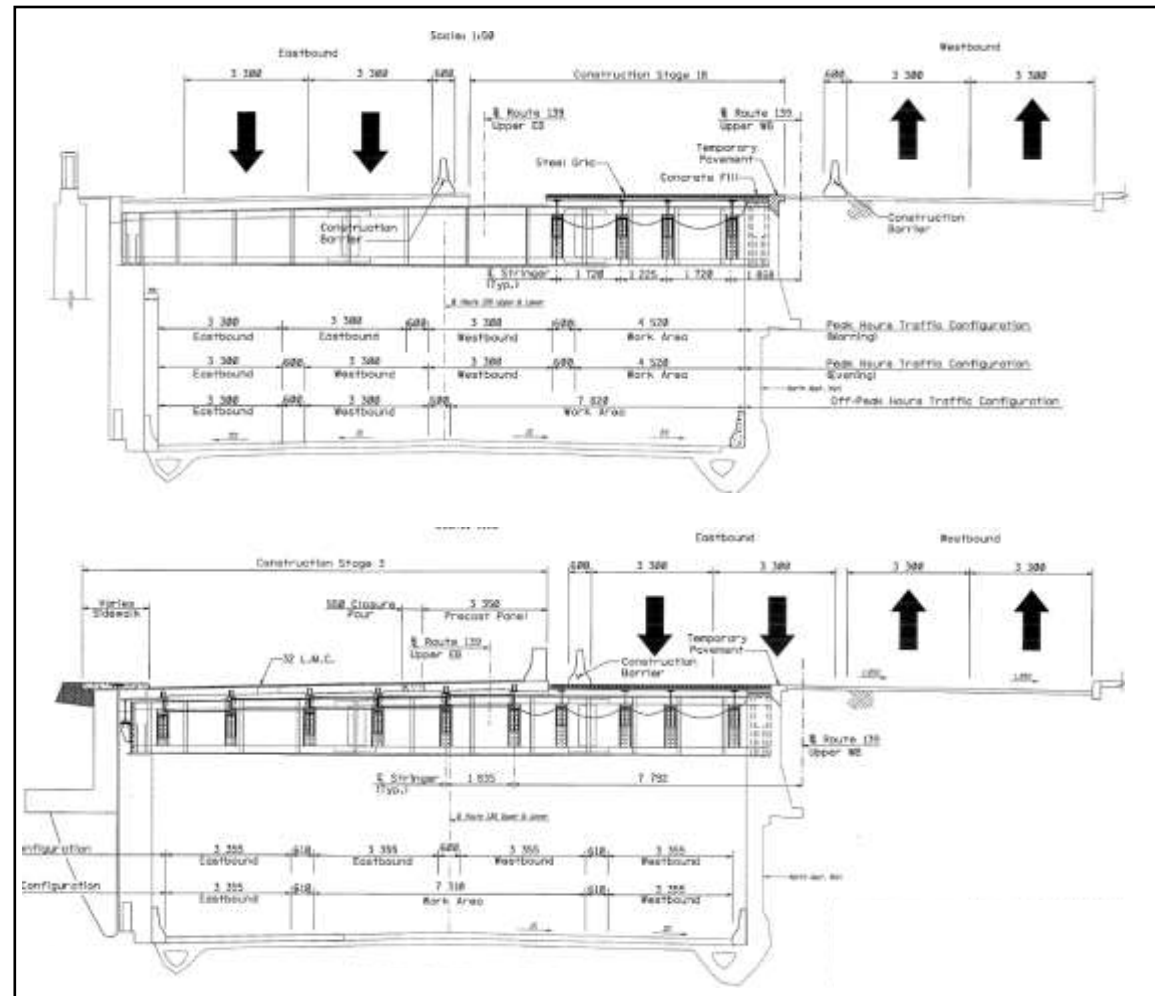
- FD Initiated in 2002

Proposed Improvements

- Remove Encasements
- Clean/Paint Floorbeams
- Strengthen if Required
- Install Metal Grating
- Replace Deck & Stringers
- Repair Abutments
- Repair Columns
- Repair Bearings

Conventional Staging

- Maintain 4 Upper Lanes
- Traffic on Grating
- Debris Netting Required



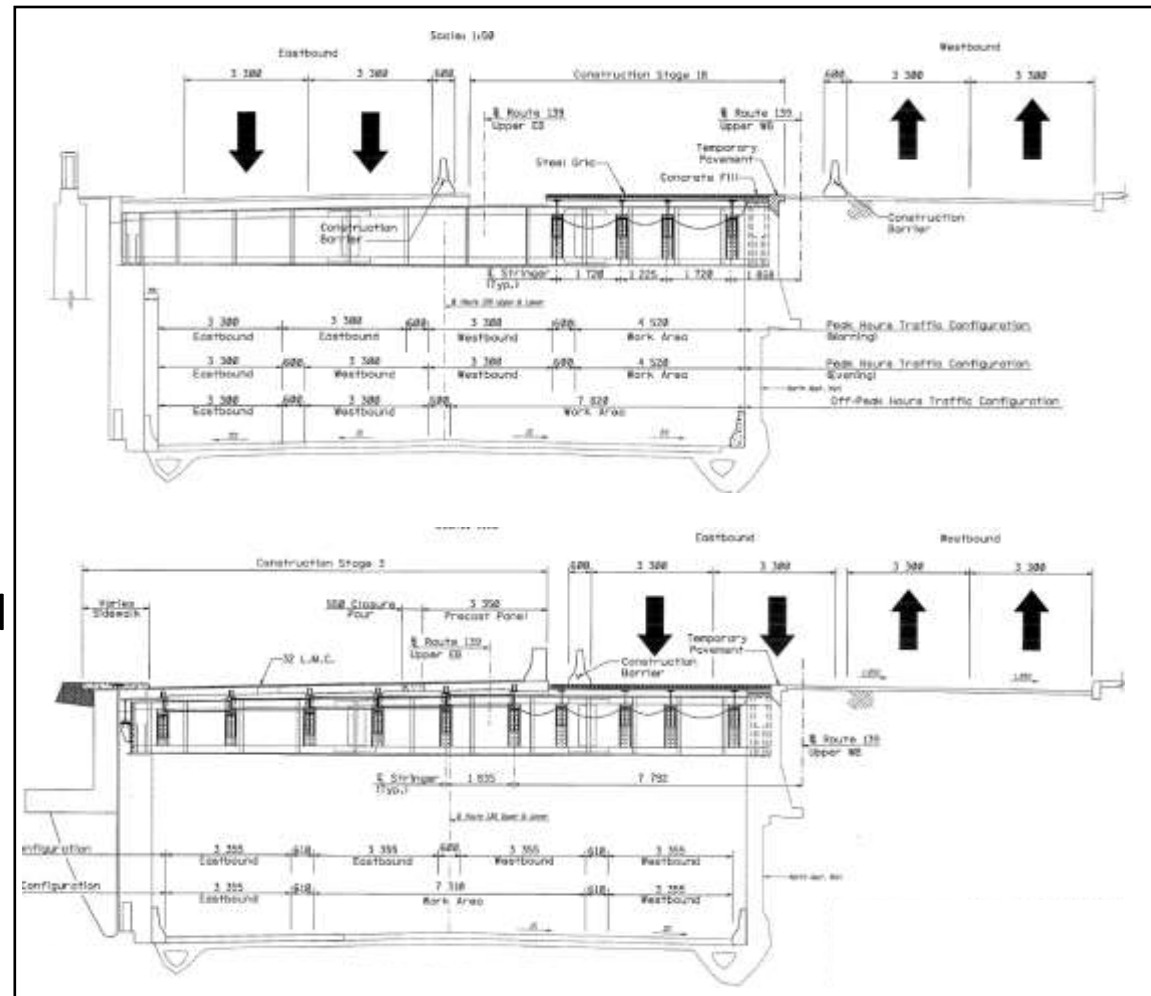
Project Shutdown (2007)

- Design 95% Complete
- Lack of Constr. Funding

GF Approached NJDOT

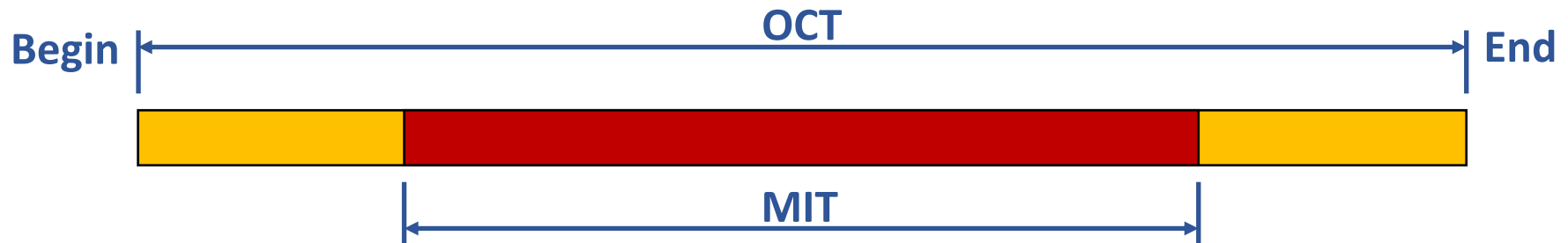
Smart Solutions (2008)

- Temp. Roadway (East End)
- Divert EB Through City Grid
- Replace Floorbeams
- Save 12 Months & \$30M
 - ✓ Eliminates Staged Rehab of Floorbeams
 - ✓ Provides Larger Work Zones
 - ✓ Simplifies Fit-Up of Steel Components



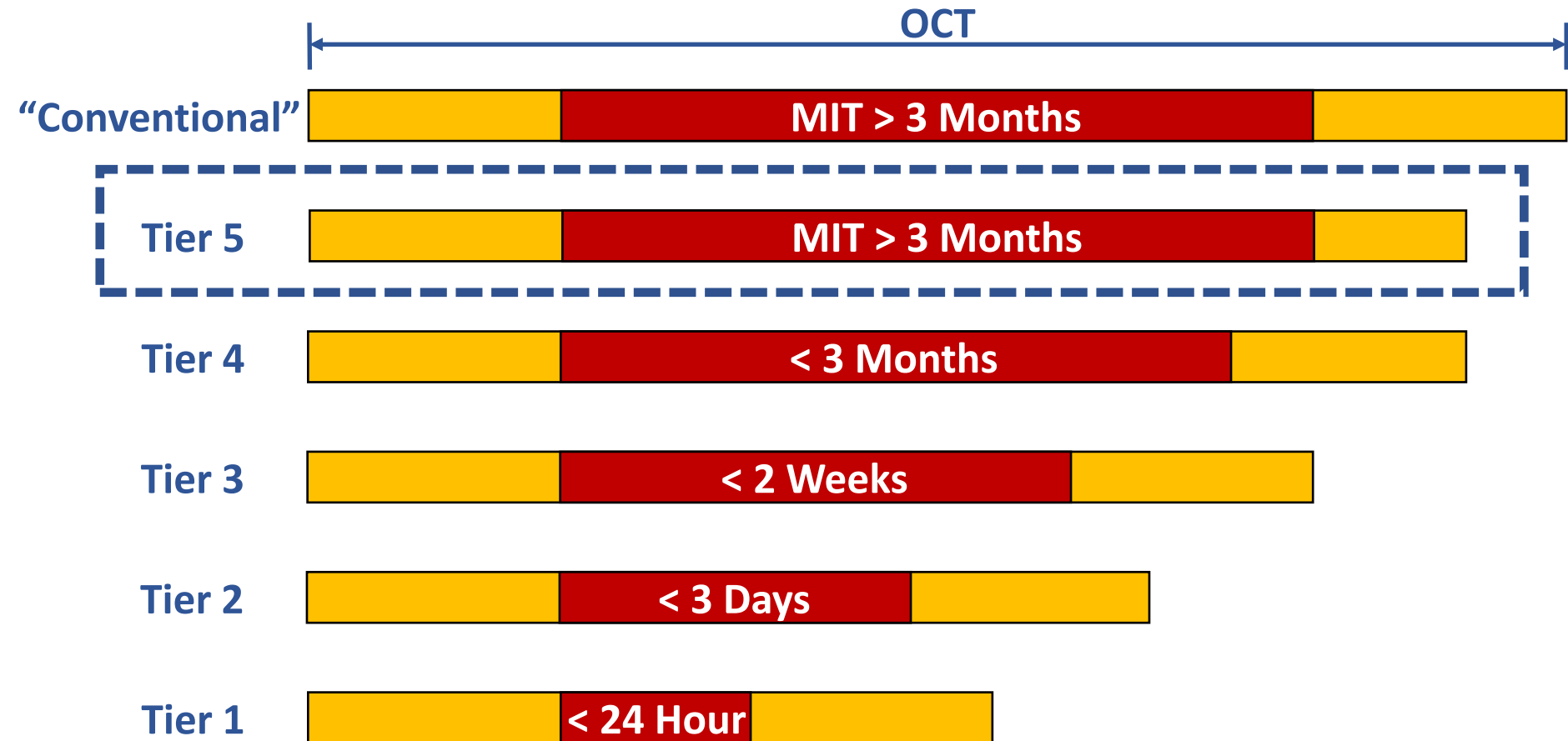
How is ABC Measured?

- **On-Site Construction Time (OCT)**
 - ✓ Total Time Bridge Site is Altered by the Contractor
- **Mobility Impact Time (MIT)**
 - ✓ Period of Time Whereby Traffic Flow is Restricted
 - ✓ Subset of OCT



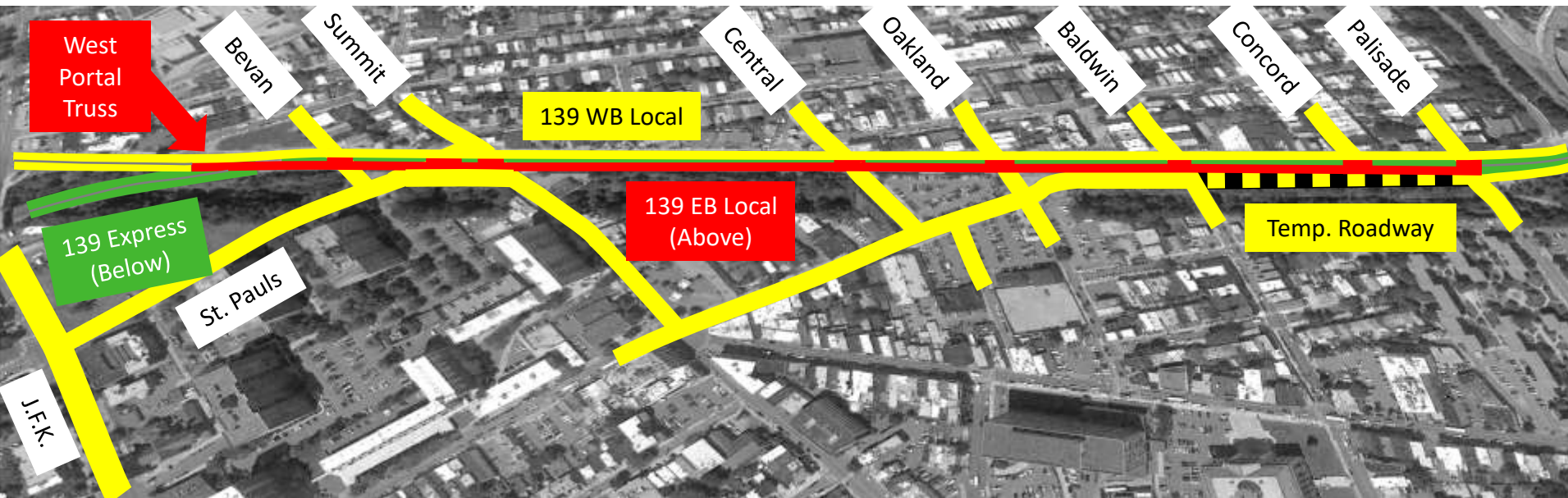
How is ABC Measured?

- Five “Tiers” Defined by FHWA



Revised (ABC) Design Concept

- Full Superstructure Replacement with Detours
- Phase 1 – Construct Temporary Roadway at East End of Viaduct
- Requires Construction of New Retaining Walls



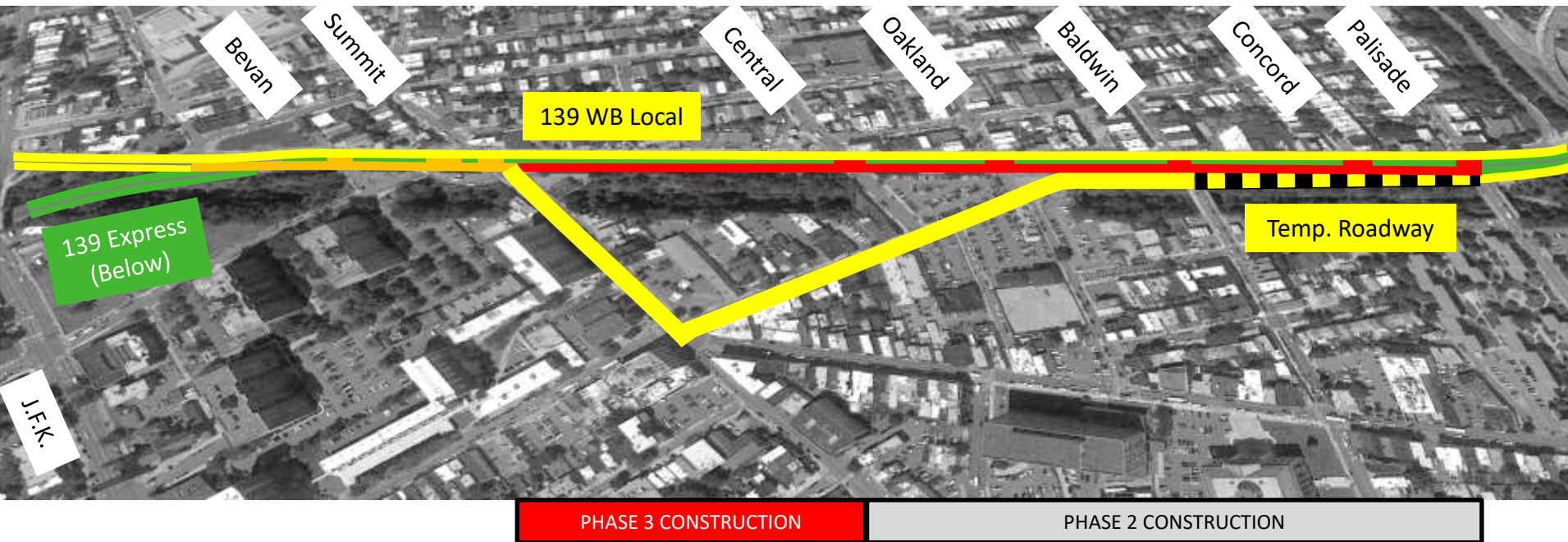
Revised (ABC) Design Concept

- Full Superstructure Replacement with Detours
- Phase 2 – Divert Upper EB Traffic at Central Avenue



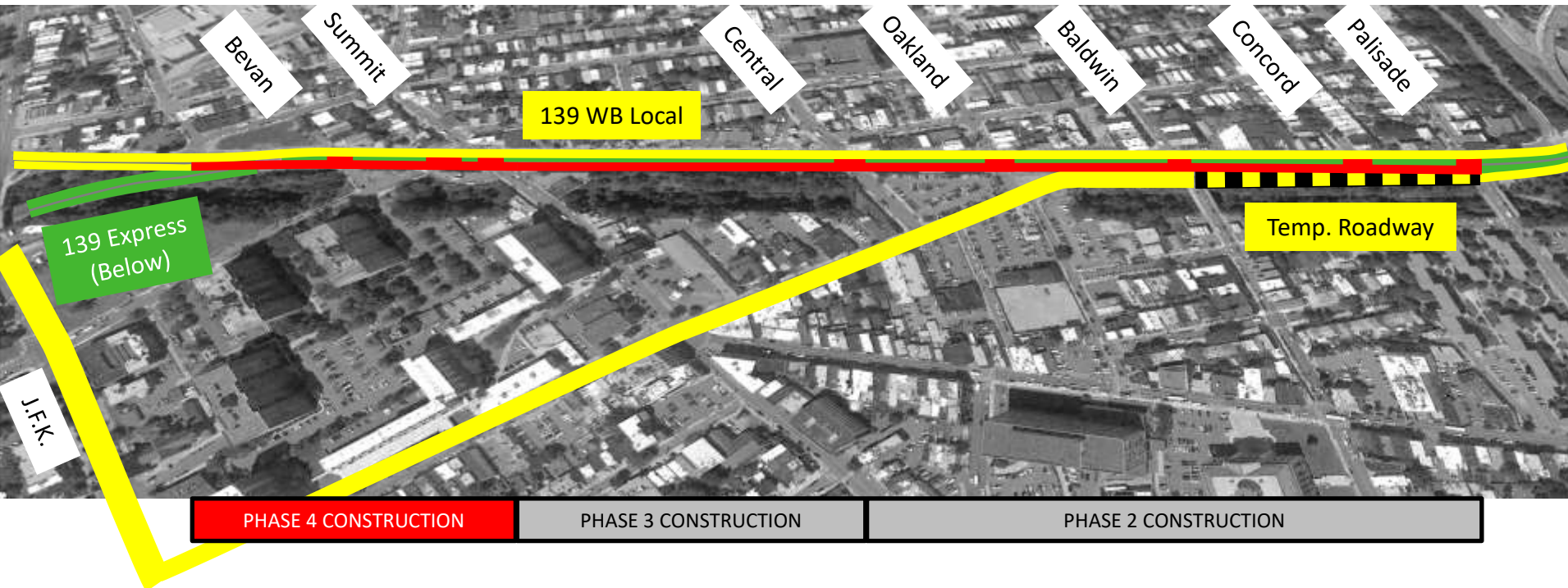
Revised (ABC) Design Concept

- Full Superstructure Replacement with Detours
- Phase 3 – Divert Upper EB Traffic at Summit Avenue



Revised (ABC) Design Concept

- Full Superstructure Replacement with Detours
- Phase 4 – Divert Upper EB Traffic at J.F.K Boulevard



Design Resumes (2012)

- Placed into Pulaski Skyway Rehabilitation Project (Contract #2)
- Design and Construction Funding by PANYNJ



Advantages of ABC Concept

- All Lanes Off Structure



Advantages of ABC Concept

- All Lanes Off Structure
- **New Floorbeams**



Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
- **New Deck and Stringers**



Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
- New Deck and Stringers
- **New Bearings**
- **New Columns**



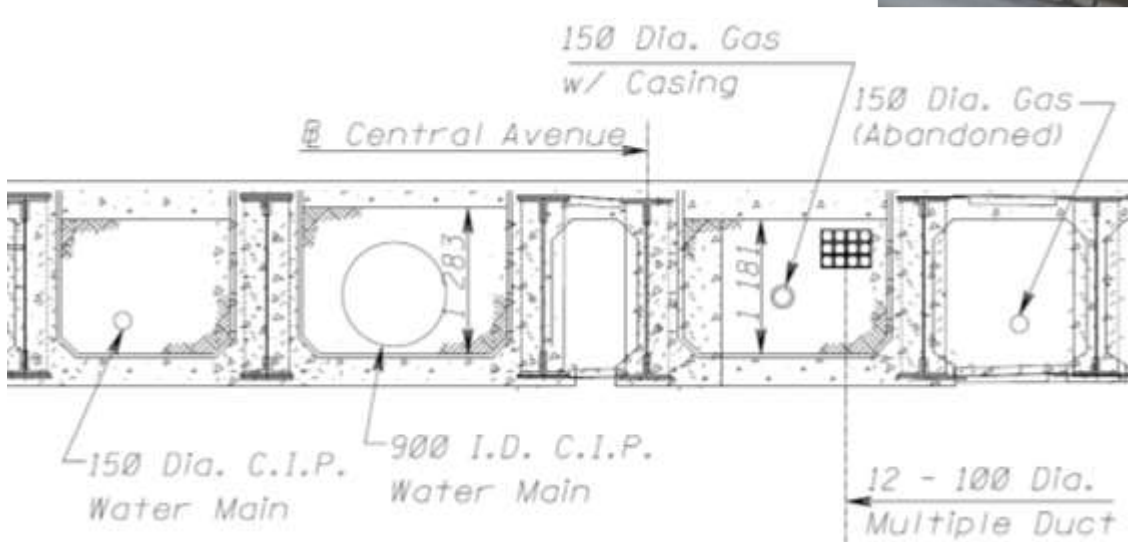
Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
- New Deck and Stringers
- New Bearings
- New Columns
- **Lighter Grating**
- **Eliminate Netting**



Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
- New Deck and Stringers
- New Bearings
- New Columns
- Lighter Grating
- Eliminate Netting
- **Eliminate Buried Utilities**



Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
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- New Columns
- Lighter Grating
- Eliminate Netting
- Eliminate Buried Utilities
- **Prefabricated Modules**



Advantages of ABC Concept

- All Lanes Off Structure
- New Floorbeams
- New Deck and Stringers
- New Bearings
- New Columns
- Lighter Grating
- Eliminate Netting
- Eliminate Buried Utilities
- Prefabricated Modules
- **Predictable Fit-Up**
- **Reduced Life Cycle Costs**



Advantages of ABC Concept

Significant Cost Reduction

Original Rehab Estimate

\$97 M

Revised Concept Estimate

\$69 M

Contractor Bid Price

\$62 M

Contract Awarded To

Schiavone Construction Co.
Secaucus, New Jersey



New Jersey Department of Transportation

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Hudson County, NJ



Thomas G. Zink, P.E.

National Bridge Practice Manager



Gannett Fleming

Questions?

(856) 304-4994

tzink@gfnet.com