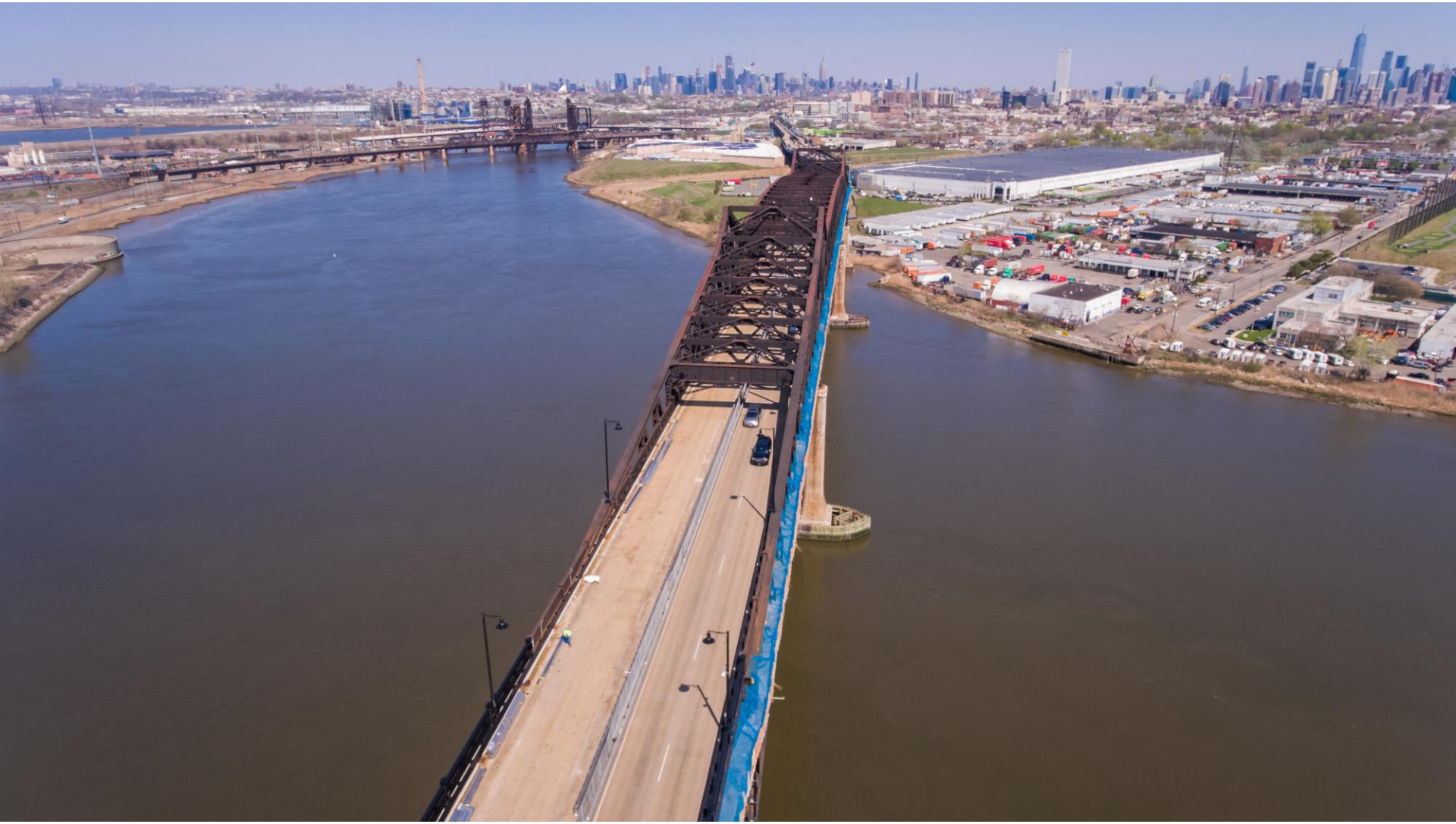
KWIKBOND POLYMERS

Polyester Polymer Concrete (PPC)



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The Bridge Deck Overlay

1. Wearing Surface = Wear Resistance
2. Protective Barrier = Impermeability

LONGEVITY

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PPC HISTORY

- PPC Developed by California DOT
  - Design finalized in 1983
- Functioning well in all climates, over 40 years

Our customer is the bridge.

Kwik Bond Polymers

- PPC overlay ~100,000,000 SF Bridge Deck Area Nationwide
- Thousands of Joint Headers & Full Depth Joints
- Thousands of patches, partial to full
- Some closure pours (all successful)
- Overlays on Steel Grid and Orthotropic Steel Decks
- >35 years of proven history

PPC - OVERVIEW

- Components
  - HMWM primer
  - Graded silica aggregate
  - Polyester resin binder
  - Abrasive top sand

No cement or water

PPC - OVERVIEW

- Properties
  - 6,000 psi Compressive
  - 800 psi Tensile
  - 1,500 psi Flexural
  - 1,500 ksi MOE
  - 0 coulombs permeability
  - Similar CTE to PCC

PPC - SUMMARY

- Bridge Deck Overlays
- ABC Closure Pours
- Full-depth Patching
- Full-depth Joints
- Joint Headers
- Grade Correction

→ Any thickness
→ 40-100 °F
→ 2-hr traffic return always
→ 0 coulombs permeability
→ 35-year proven service

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PPC – SURFACE PREP

- Surface Preparation
  - Clean
  - Sound
  - Visibly Dry

PPC – HMWM PRIMER

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PPC - INSTALLATION

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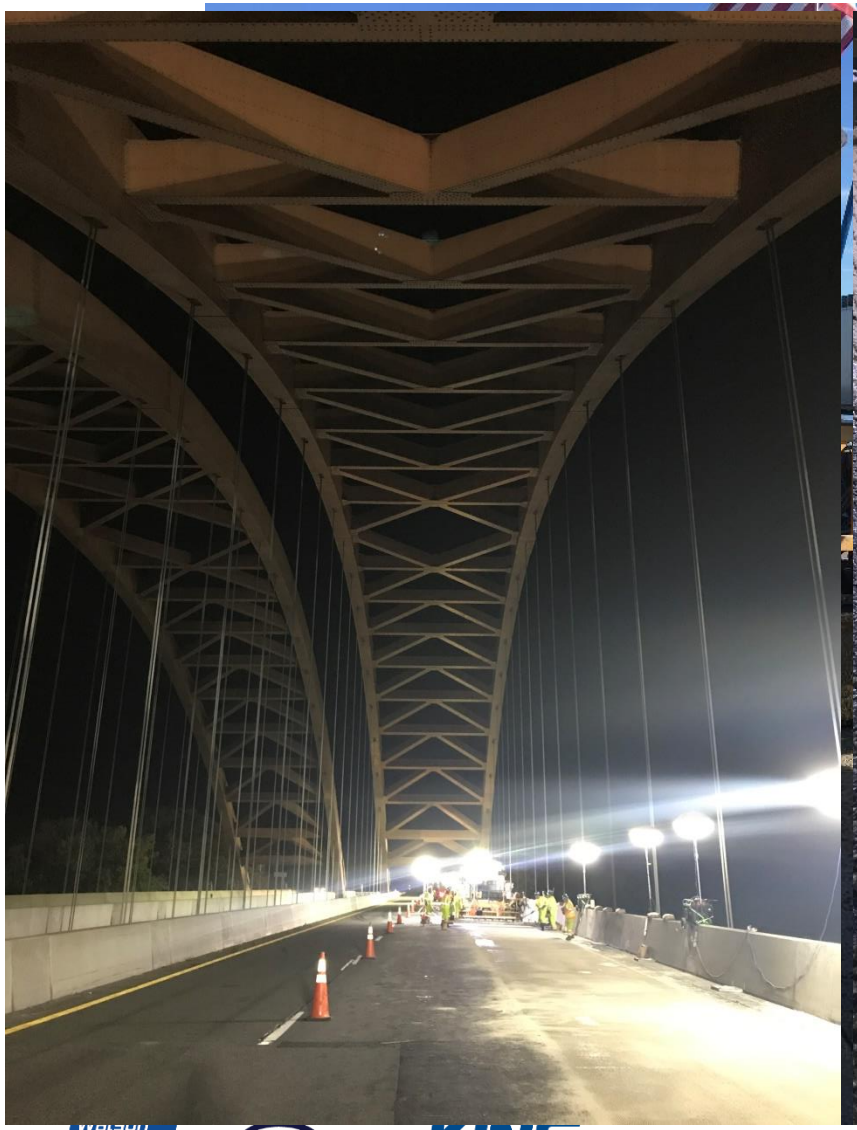
PPC - INSTALLATION



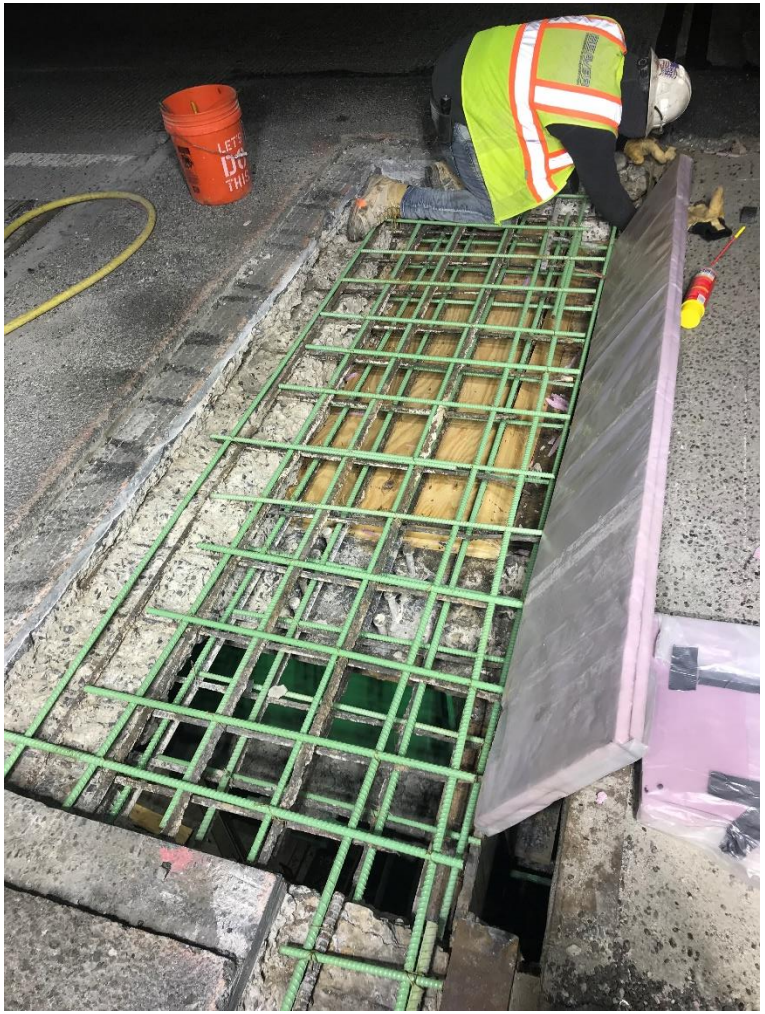
PPC - INSTALLATION

PPC - ACCEPTANCE

- Tensile Bond Test
  - 250 psi minimum
  - Failure in substrate

JOINT HEADERS & PATCHING

JOINT HEADERS & PATCHING



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JOINT HEADERS & PATCHING

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JOINT HEADERS & PATCHING

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PPC – TRAFFIC RETURN

2 Overlay-Only Contracts

	Project #1	Project #2
Bid Date	Fall 2021	Winter 2021
Completion Date	Fall 2022	Winter 2023
Thickness	2”	2”
Deck Area	590,000 SF	635,000 SF
Overlay Qty	~3,600 CY	~4,000 CY
% Complete	100%	100%
Contract Amount	**$16 Million**	**$71 Million**

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PROJECT #1 – PPC

- SR-1, USACE
  - Cable-stay segmental box girder bridge
  - Remove 2” LMC Overlay by milling/shot blasting
  - Replace 2” PPC Overlay
  - Just an overlay contract
  - 590,000 SF / 3,600 CY

$16 Million

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PROJECT #2 - UHPC

- Delaware Memorial Bridge, DRBA
  - Suspension bridge
  - Remove 2” Existing Deck using hydrodemolition
  - Replace 2” UHPC Overlay
  - Just an overlay contract
  - 635,000 SF / 4,000 CY

$71 Million (!!!!!)

(Annual PPC patching contract since 2012)

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PPC VS UHPC

- Both projects bid late ‘21
- PPC 100% complete in few weeks
- UHPC 100% complete in many months
- UHPC took more than 2x longer
- Overlay quantity within 10% of each other
- UHPC costs $50+ Million more than PPC

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TIME & COST

Asphalt

- Fast
- Cheap

Asphalt w/ Membrane

- Slower
- Spray-applied = $7-10/SF (just the membrane)
- Weather sensitive

TIME & COST

LMC w/ Milling

- 4-12 hr cure (VES 3-4 hrs)
- $10-15/SF

Structural/Not Composite

LMC w/ Hydro

- 4-12 hr cure (VES 3-4 hrs) + Hydro
- $20-30/SF

Structural & Composite

UHPC w/ Hydro

- 3-day cure
- $60-100/SF

TIME & COST

3/8” Multi-layer Epoxy w/ shot blasting

- 2-8 hrs per lift (temp dependent)
- $5/SF

1” Epoxy Polymer Concrete w/ shot blasting

- 2-8 hrs (temp dependent)
- $15/SF

1” PPC w/ shot blasting

- 2-hr traffic return always
- $10-12/SF

Add 25% to PPC bid price for HCSC

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Goethals Bridge - 2017

PPC-1121 on New Concrete Deck

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Kosciuszko Bridge – 2017 & 2020

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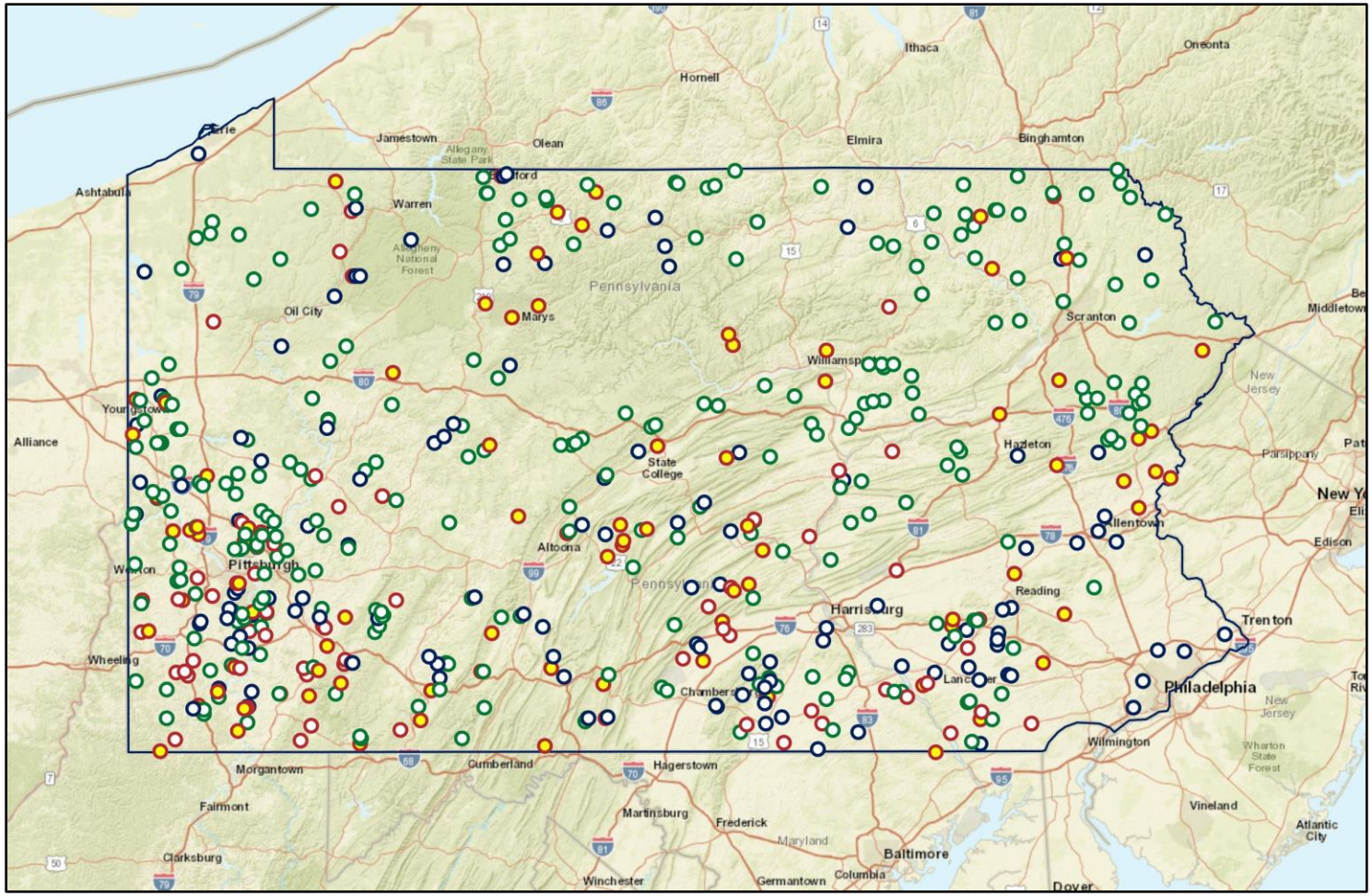
Rapid Bridge Replacement P3 – 2015-2020
~450 Bridges, ~950,000 SF total



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PPC-1121 on New Concrete Decks

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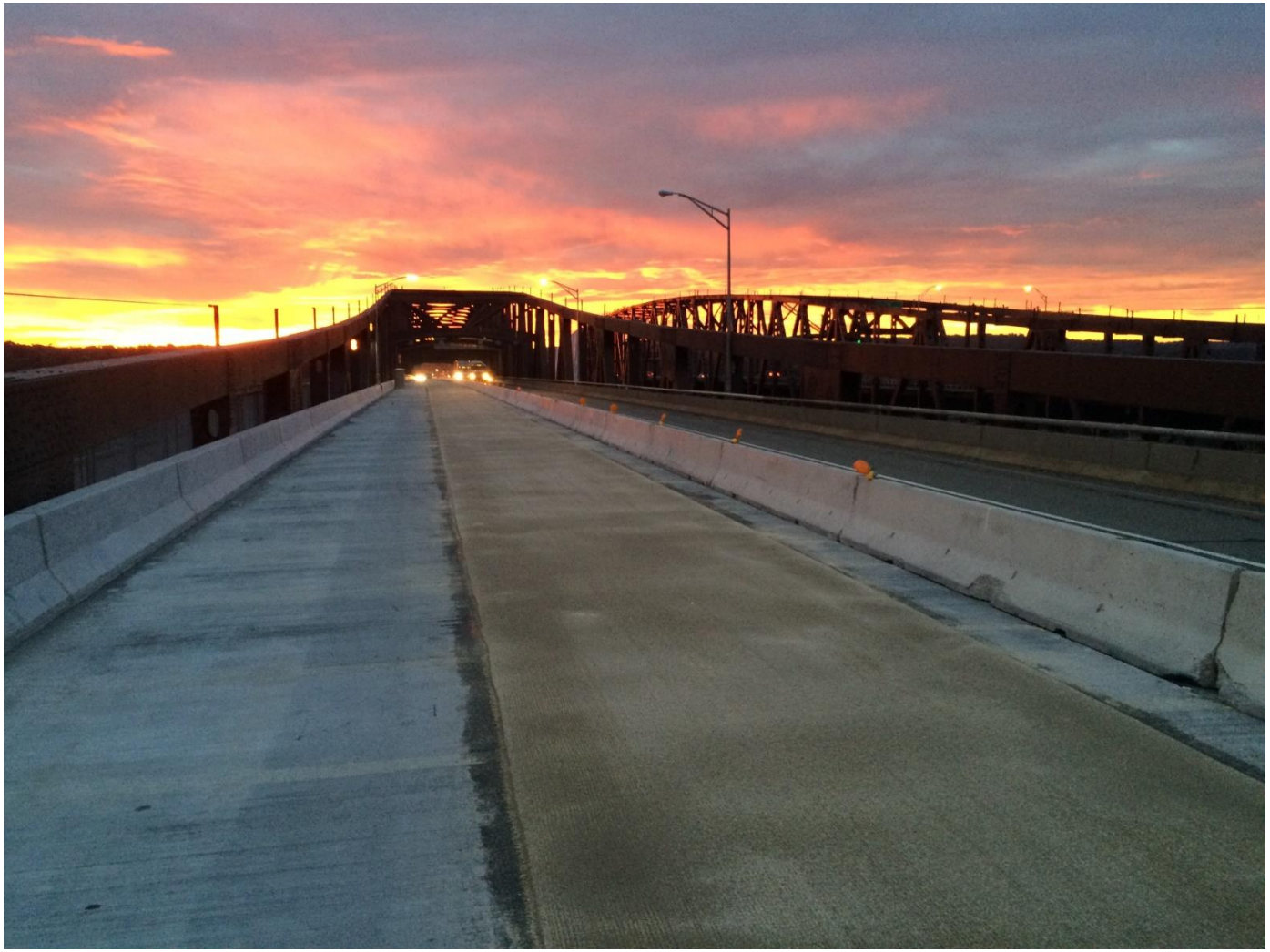
Newburgh Beacon Bridge – 2014 & 2021



Scudder Falls Bridge - 2021

PPC-1121 on New CIP Concrete Deck

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ROUTE 133 OVER HOUSATONIC RIVER 2019

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Polyester Polymer Concrete (PPC)

Thank you!

Tzur Frenkel
724-718-5678
Kwik Bond Polymers
frenkel.tzur@us.sika.com

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