

# NEW NICE BRIDGE



Maryland  
Transportation  
Authority

Contract Number: NB-0543-0000

Governor Harry W. Nice/Senator Thomas "Mac" Middleton Bridge  
Replacement Design-Build Project



Maryland Concrete Conference Presentation  
03-01-2023

# Design-Build Contractor

**SKANSKA**

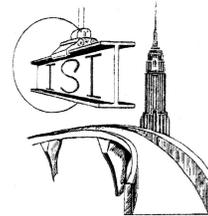
**CORMAN**  
K O K O S I N G

**McLean**

**AECOM**



**CHANEY**  
ENTERPRISES



# Designers

# AECOM



HSA, Inc.

# Independent Design Quality Manager - IDQM



# Quality Assurance Team



# Quality Assurance Scope

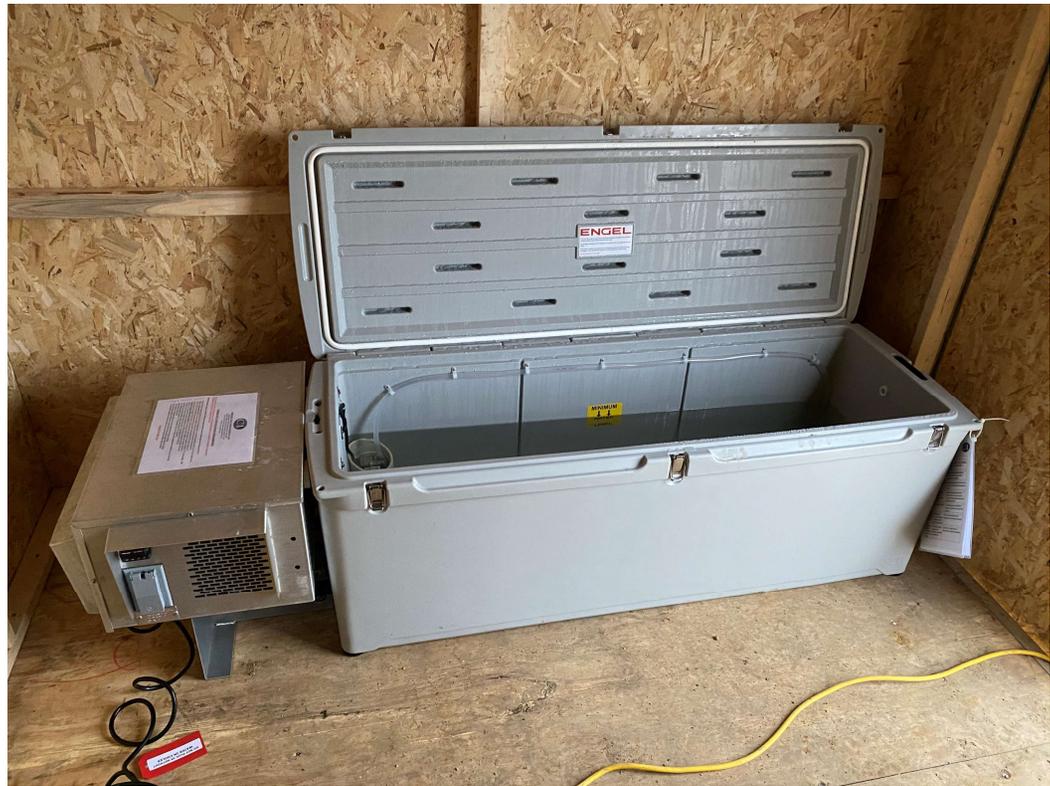
- Safety
- Environmental compliance
- Acceptance inspection and materials testing
- On-site soils and concrete lab
- Materials clearance
- Civil Rights reviews
- ITS commissioning and integration coordination
- 45 pairs of boots on the ground



# Materials Testing and Lab Services



# Materials Testing and Lab Services



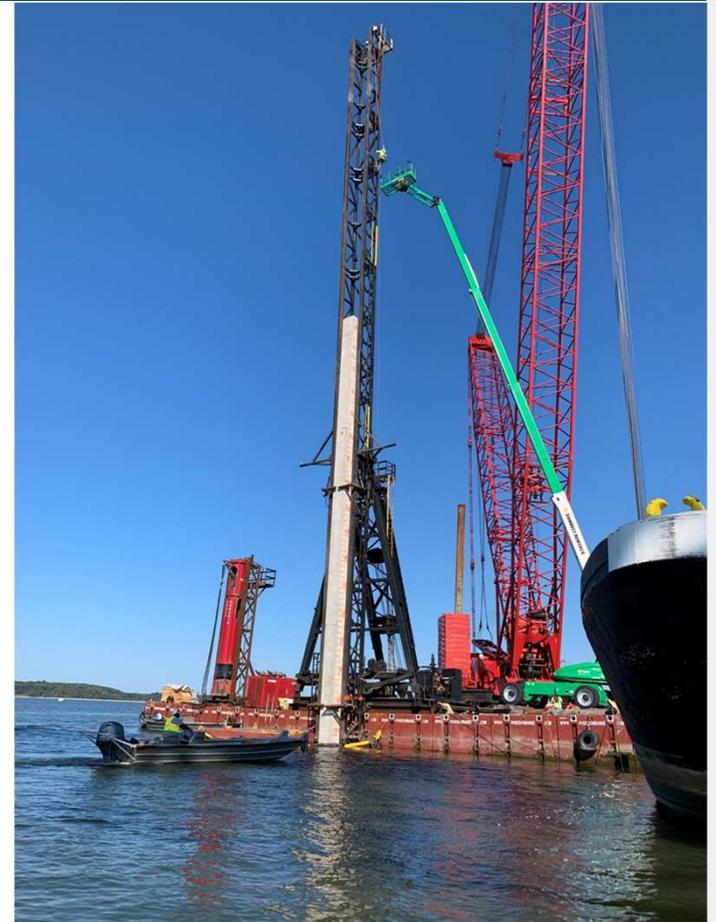
# Project Challenges



- Safety
- Environmental compliance
- 100-year design life
- Quality
- ITS commissioning and integration

# Safety

- Daily DHA
- On-site medical facility – full-time NP
- COVID
- MDTA full-time on-site safety manager
- Drone inspection
- Vibration monitoring – FTG
- No Wake Campaign
- EarthCam



# Safety – drone inspection



# Safety – drone inspection

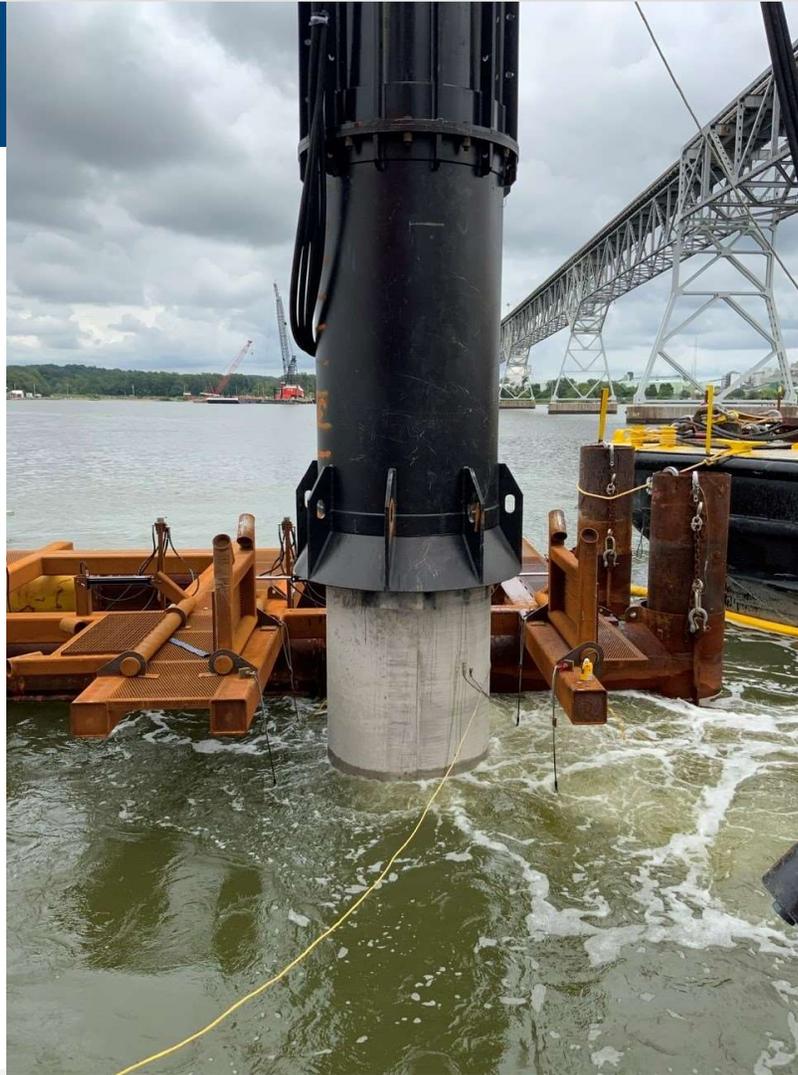




# Environmental Compliance



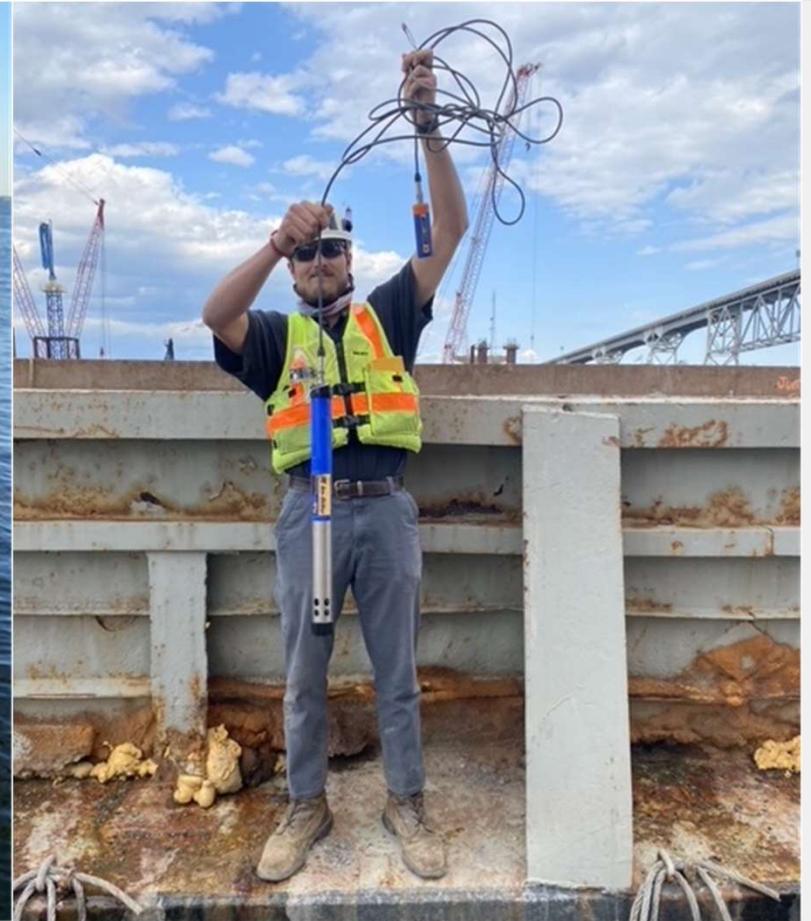
# Bubble curtains



# Environmental Compliance



# Environmental Compliance





# 100-Year design life



# 100-Year Design Life

- Corrosion protection plan
  - Chloride corrosion modeled using fid Bulletin 34 Model Code for service life design
  - Max allowable chloride coefficients per NT Build 492
  - Joints minimized (14) with Virginia drainage trough detail
  - Low carbon/ chromium reinforcing steel
  - 8' long fiberglass jackets on low level spans (EL +4' to -4')
  - Use of concrete tubs

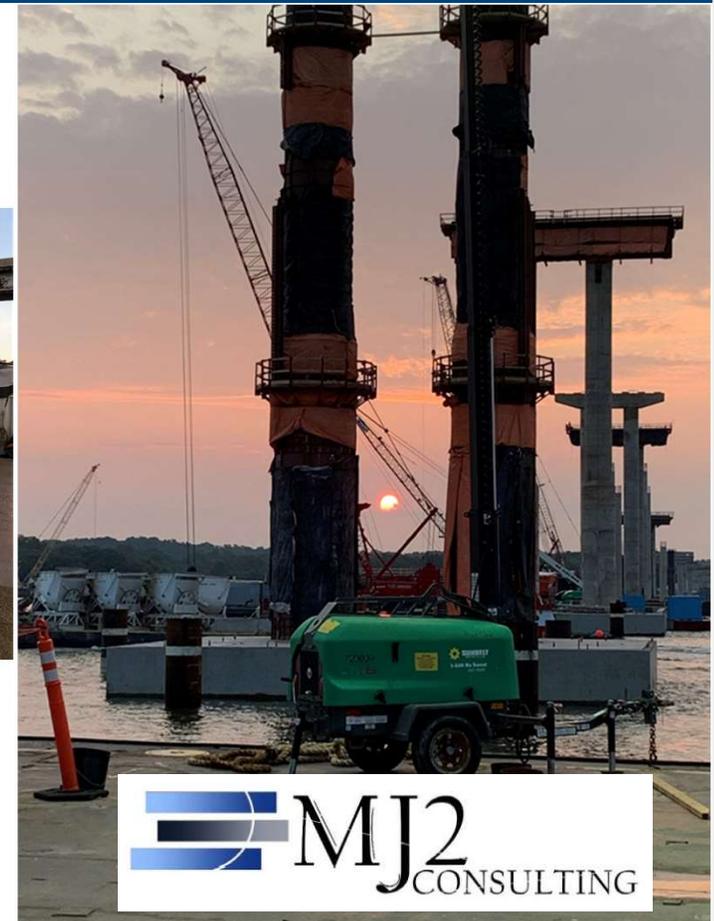
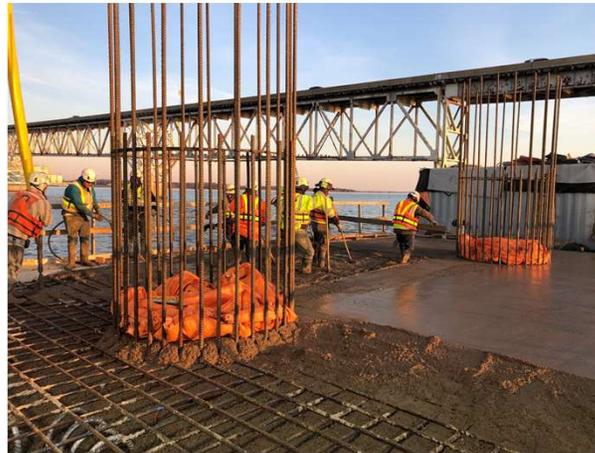


**SIVA CORROSION SERVICES, INC.**  
Materials, Corrosion, and NDT Services

# 100-Year Design Life

- Thermal control plan
  - Prevent cracking
  - Monitor weather
  - Concrete curing/temperatures
- Concrete construction & inspection
  - Rebar type and cover
  - Quality control for concrete
  - Finish/ cracks/ honeycomb

**EXACT**



**MJ2**  
CONSULTING



# Precast/Prestress Highlights

- 36" square piles (770)
- 66" cylinder piles (90)
- 79" PCBT beams (189)
- 95" PCBT beams (232)
- Footing tubs (29)
- Fender rings (8)
- Drain troughs (13)



# Cape Charles Plant



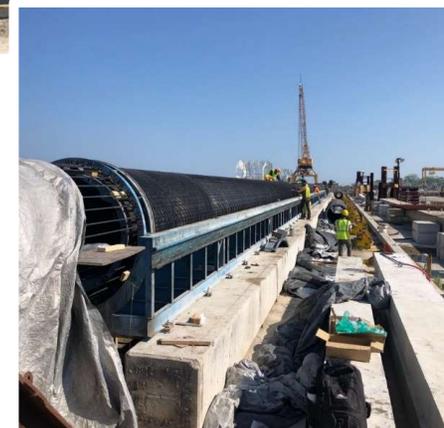
# 36" Prestressed Square Pile

- Piles utilized several VDOT specifications
- Length: up to 206ft
- Weight: up to 139 tons
- Conventional uncoated prestress strand
- Galvanized spiral reinforcement



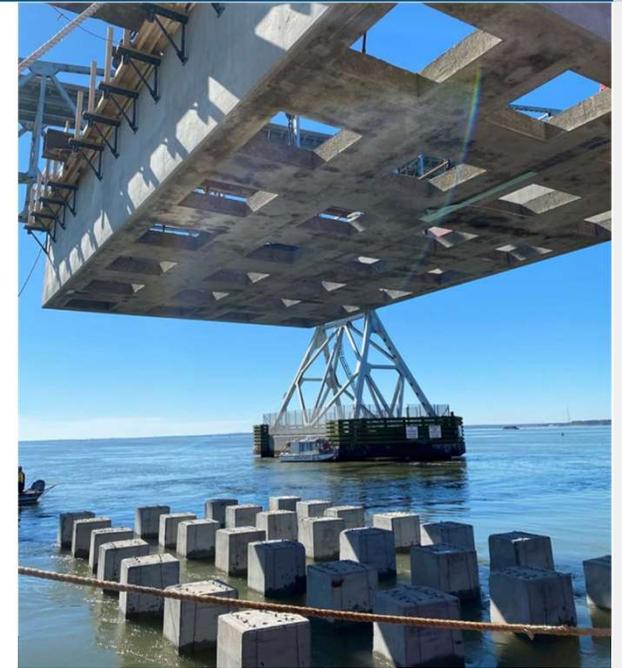
# 66" Prestressed Cylinder Pile

- Length: up to 198 ft
- Weight: up to 130 tons
- Conventional casting methods
- “Static” cast with collapsible mandrel
- Carbon Fiber Reinforced Polymer (CFRP)
  - 7-strand 0.6” prestress strands
  - Spiral: 9.7MM mono-wire (large tow)
  - Alternate to stainless steel

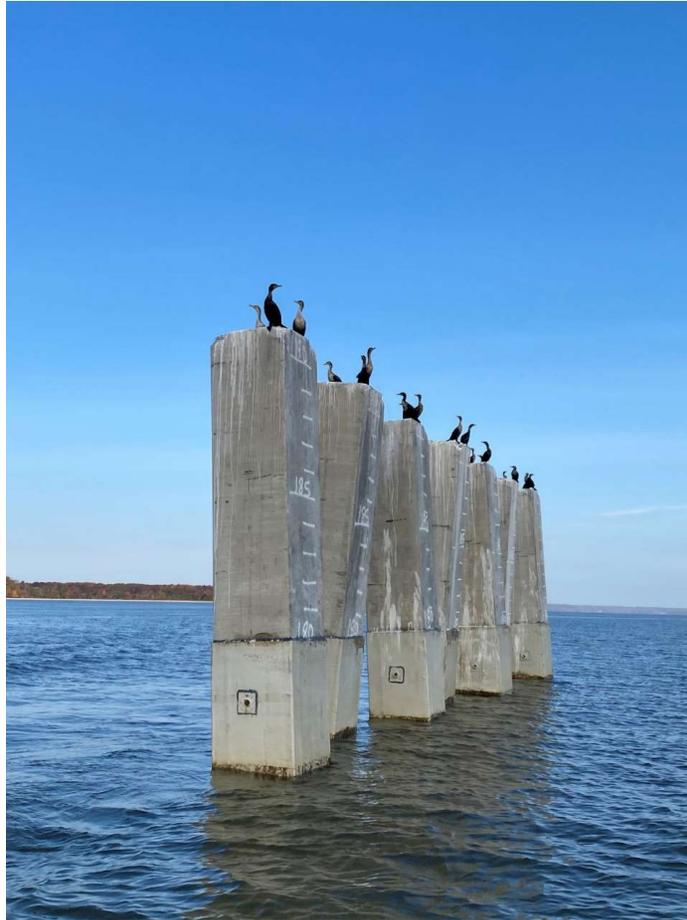


# Pier Footing Bathtubs

- Accelerated construction exponentially
- Weights ranged from 150 to 192 tons
- Concrete strength: 7,500 psi



# 100-year Design Life: Pile Jackets



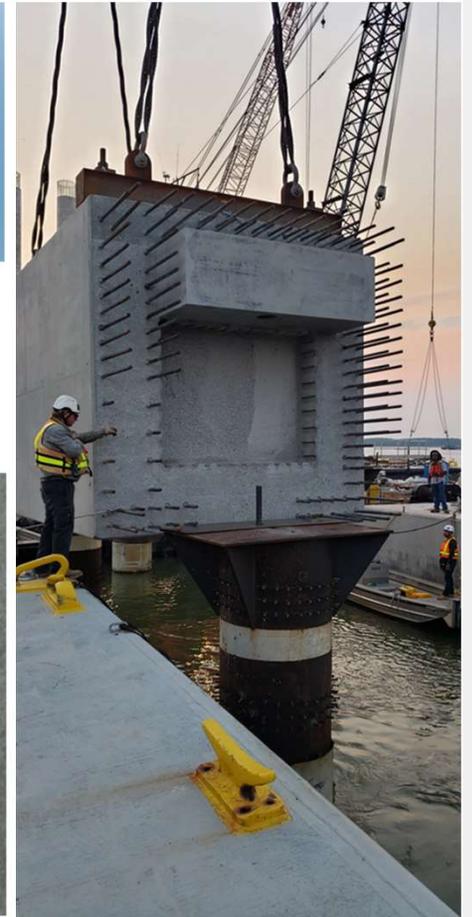
# Concrete Tubs





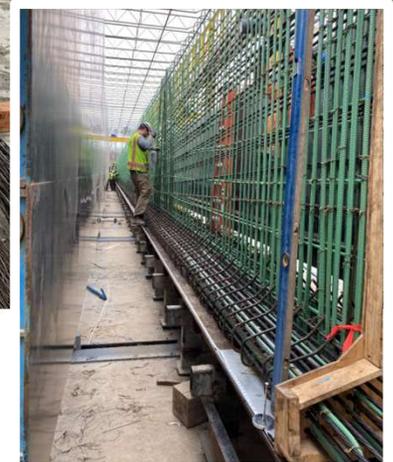
# Pier Protection Fenders

- For Piers 43 and 44
- Each segment weighed approximately 160 tons
  - 73 cubic yards of concrete (8,000 psi)
  - EPS foam voids



# PCEF Bulb Tee Beams

- Indoor manufacturing
- 95" tall bulb tee beams
  - Length: 172'-11" to 174-8"
  - Weight: 111 - 113 tons
  - Epoxy-coated rebar
  - 0.6" prestressing strands: 64
    - Draped strands: 24
  - 10,000 psi concrete
- 79" tall bulb tee beams
  - Length: 122'-2" to 149'-5"
  - Weight: 70 - 86 tons
  - Epoxy-coated rebar
  - 0.6" prestressing strands: 47 & 61
    - Draped strands: 15 & 21
  - 10,000 psi concrete
  - Finished beam required minimal finish work



# Drainage Troughs

- “Virginia Pier”
- To collect rainwater from expansion joints



# Delivery by Barge

- 120+ barge loads
- To the jobsite:
  - From Cape Charles, 105 miles
  - From Chesapeake, 145 miles
- Barge delivery is less obtrusive to public
- Get in, get out, stay out!!!

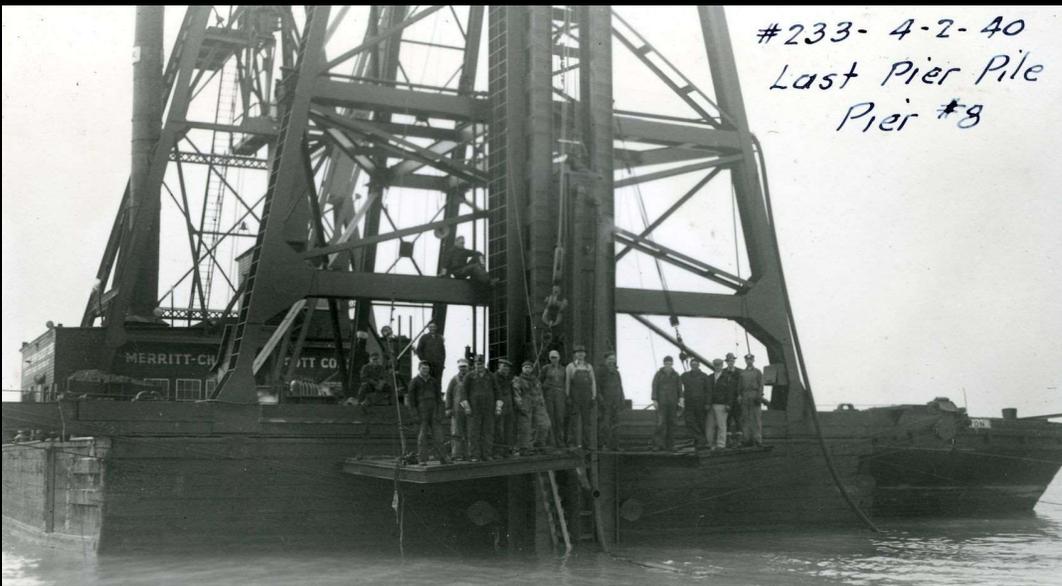


# Quality

- Design
  - EOR – AECOM
  - IDQM
- Construction
  - Survey
  - Pile driving
  - Concrete girders
  - Steel girders
  - Concrete placements/ bridge decks









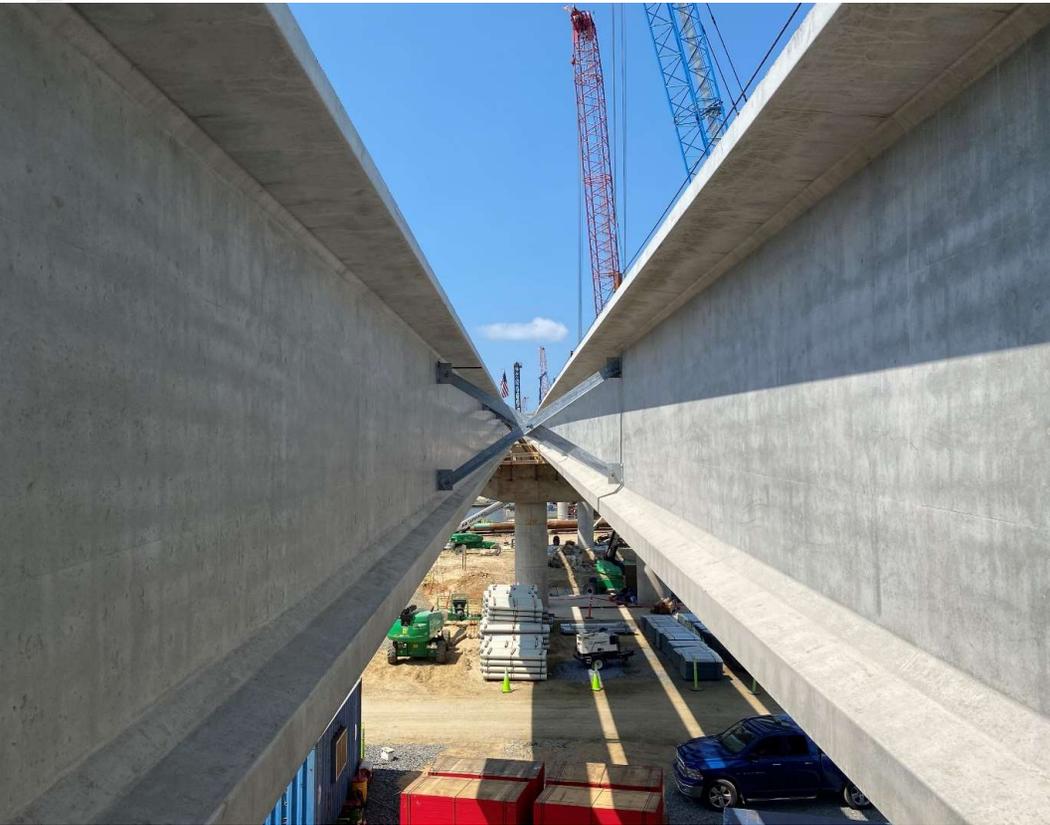
# Quality - piles



# Quality – piles



# Concrete Girder Erection







Girder G2

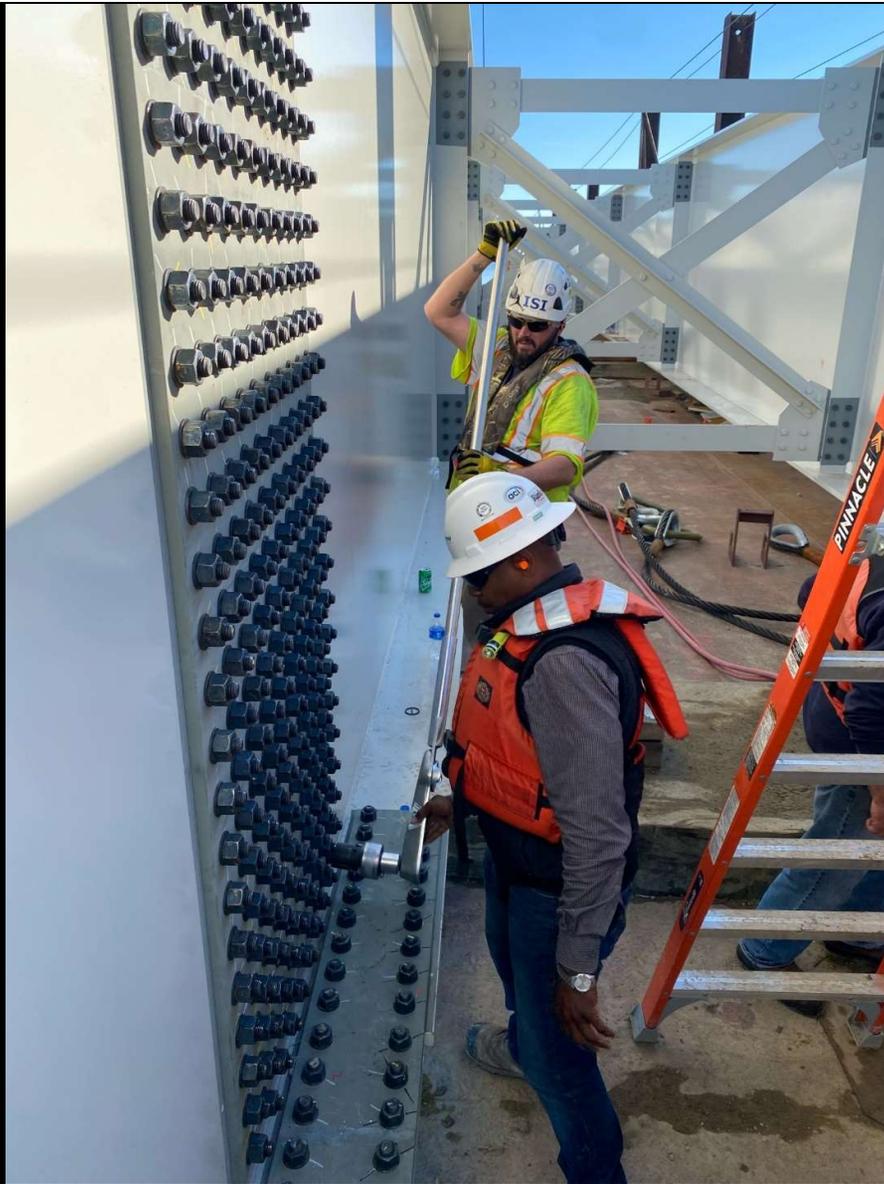
11"

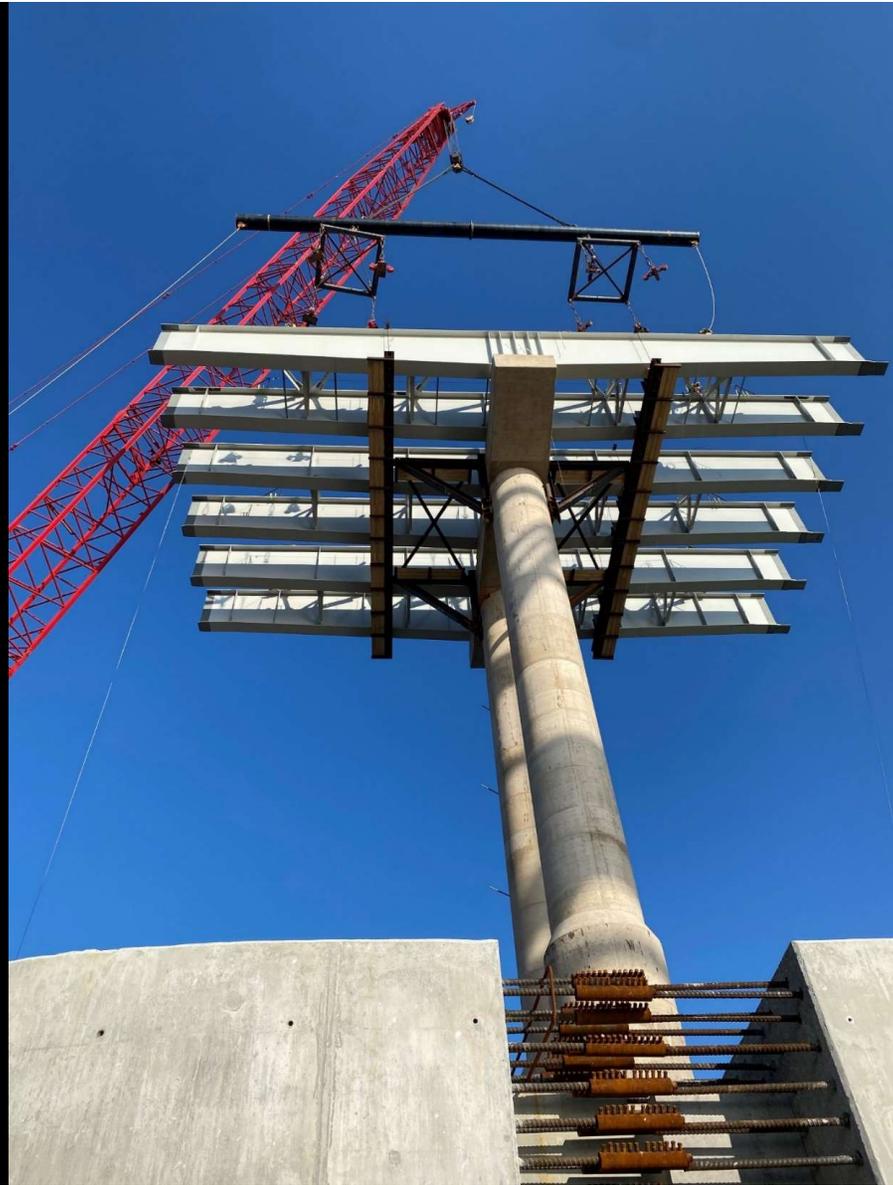


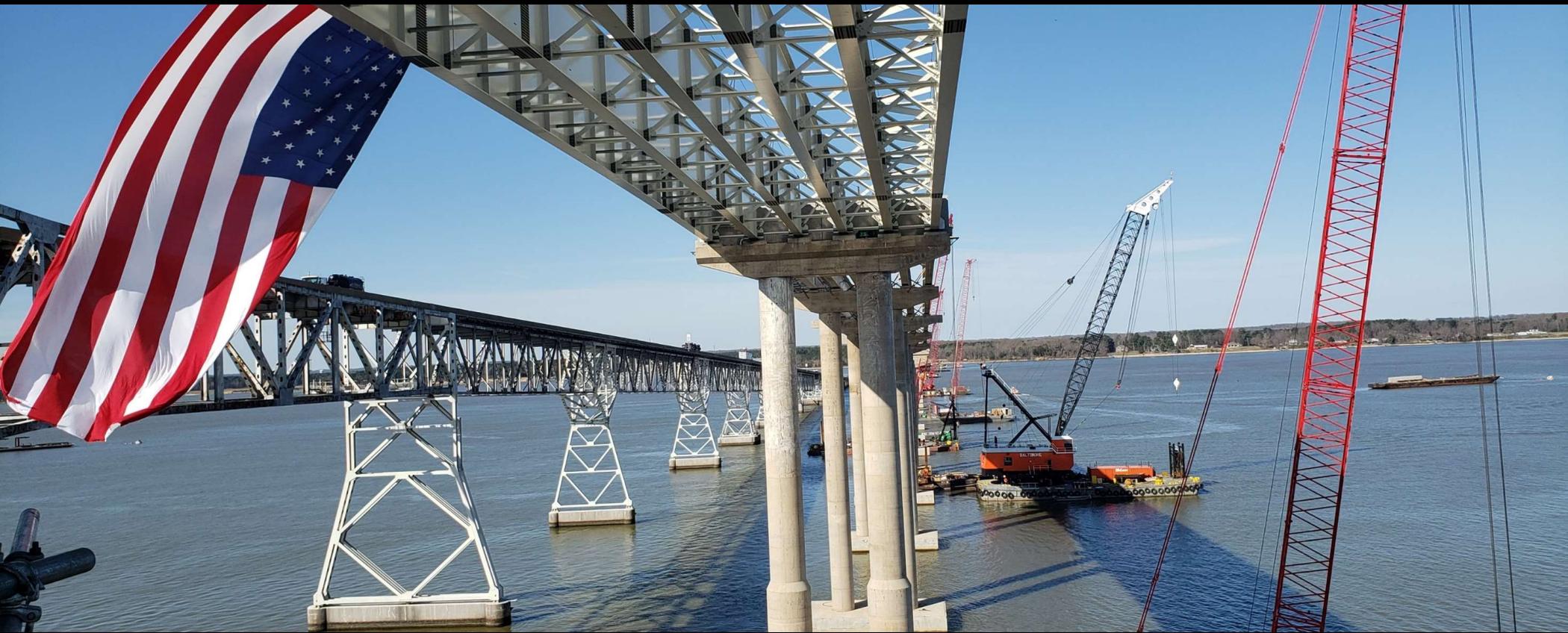
# Quality – Structural Steel



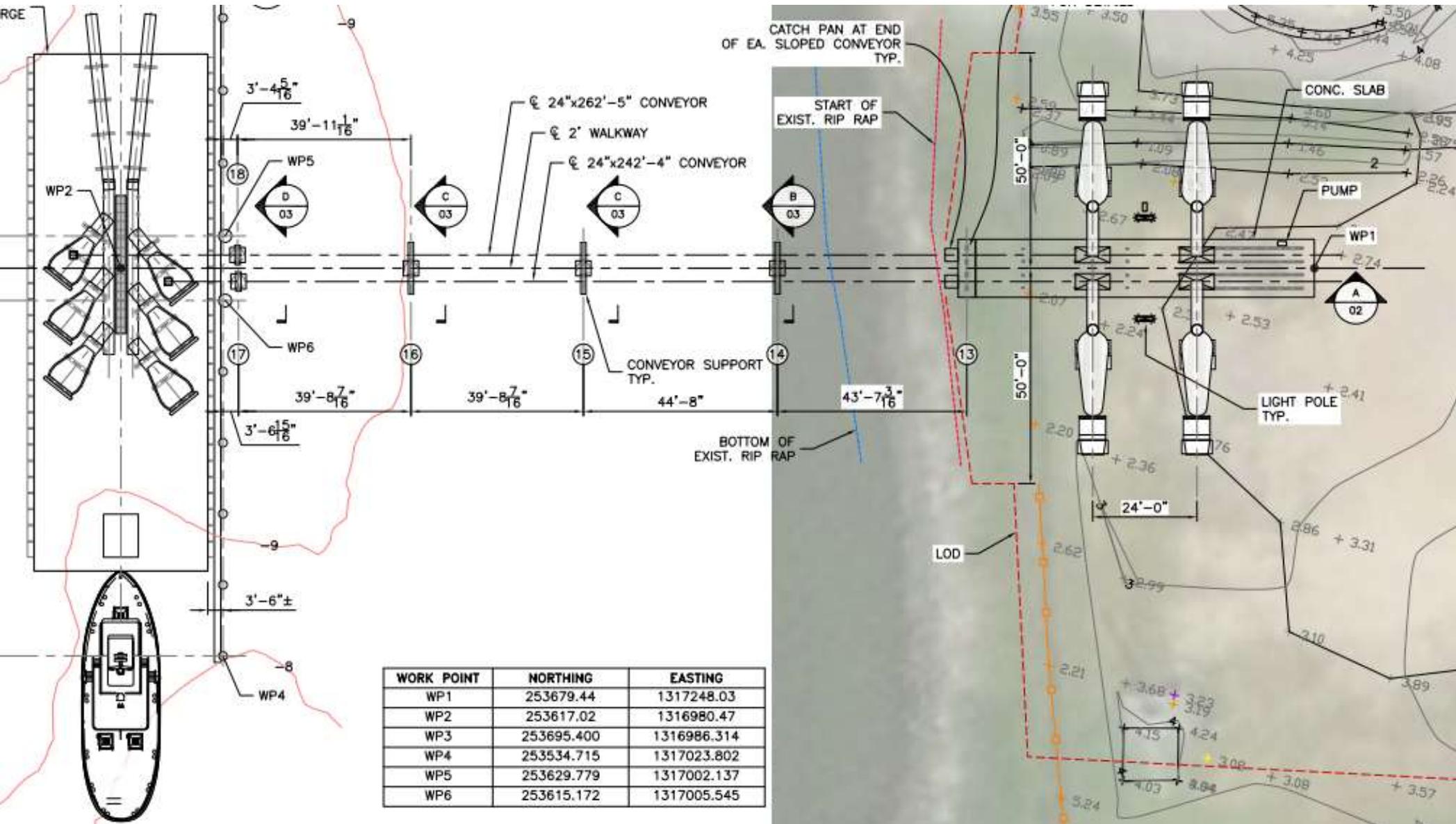






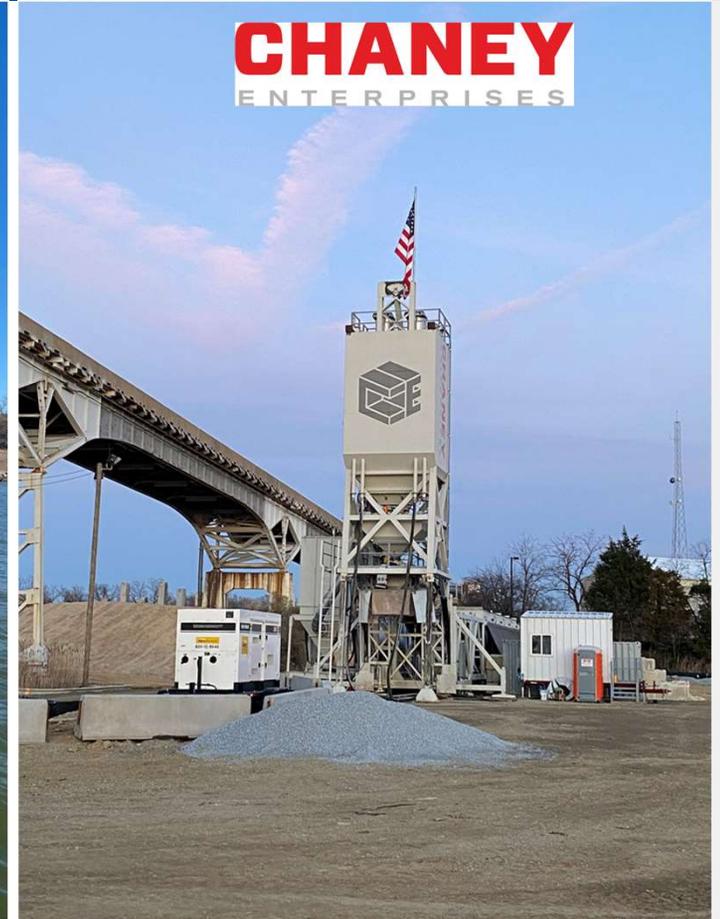
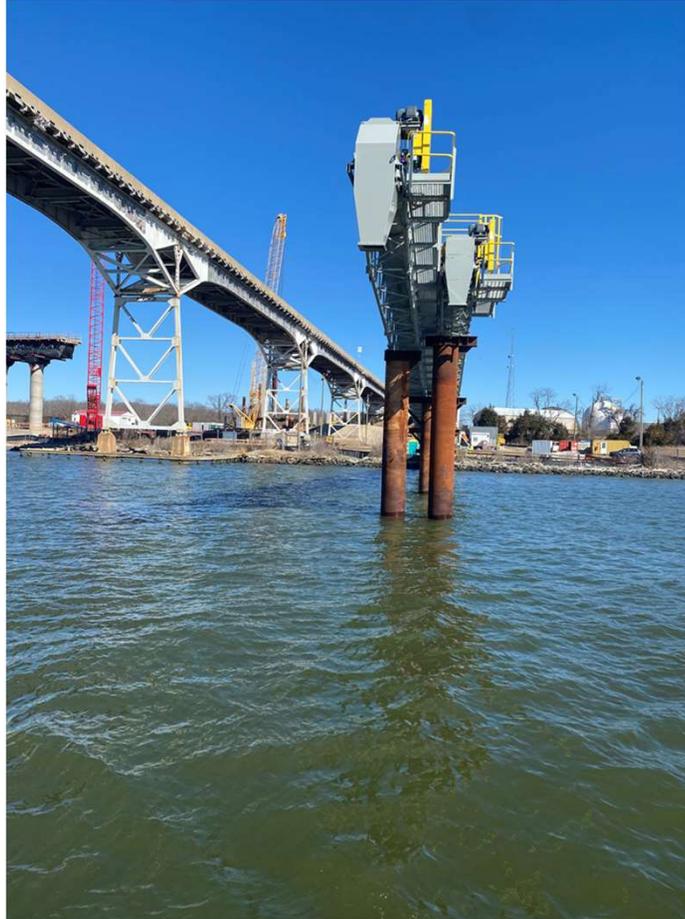






# Logistics

- On-site Batch plant
- Conveyor/agitators/remixers
- Quality control









LAND BRACK METRO HAZAR Time TROU WIND TEST A/R MODS.

44	9	4	386	F	10	440			
45	9	1	380	N	10	450			
46	9	5	245	F	10	460			
47	9	2	350	N	10	470	⊕		
48	9	6	386	F	10	480			
49	9	3	300	N	10	490			
50	10	10	350	N	10	500			
51	10	7	349	F	10	510	⊕		12 oz Air 107
52	10	11	329	N	10	520			
53	10	8	349	F	10	530			
54	10	12	292	N	10	540			
55	10	9	269	F	10	550			
56	11	1	349	F	10	560	⊕		20 oz Air 108
57	11	4	268	N	10	570			
58	11	5	329	N	10	580			
59	11	2	244	F	10	590			
60	11	6	292	N	10	600			
61	11	3	269	F	10	610	⊕	R	109/110

106  
Trucks too out again

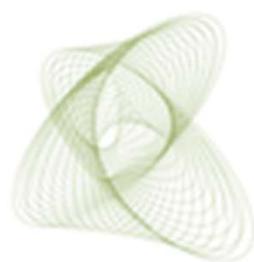
12 oz Air 107

20 oz Air 108

109/110

LAND BRACK METRO HAZAR Time TROU WIND TEST A/R MODS.

62	12	10	268	N	10	620			19 oz air
63	12	7	349	F	10	630			
64	12	11	329	N	10	640			
65	12	8	244	F	10	650			
66	12	12	292	N	10	660	⊕		111
67	12	9	269	F	10	670			30 oz.
68	13	1	349	F	10	680			
69	13	4	268	N	10	690			
70	13	5	329	N	10	700			
71	13	2	244	F	10	710	⊕	R	112 113
72	13	3	292	F	10	720			25 oz.
73	13	6	269	N	10	730			
74	14	7	268		10	740			
75	14	10	349		10	750	⊕	R	
76	14	11	329		10	760			114
77	14	8	244		10	770			
78	14	9	292		10	780			
79	14	12	269		10	790			



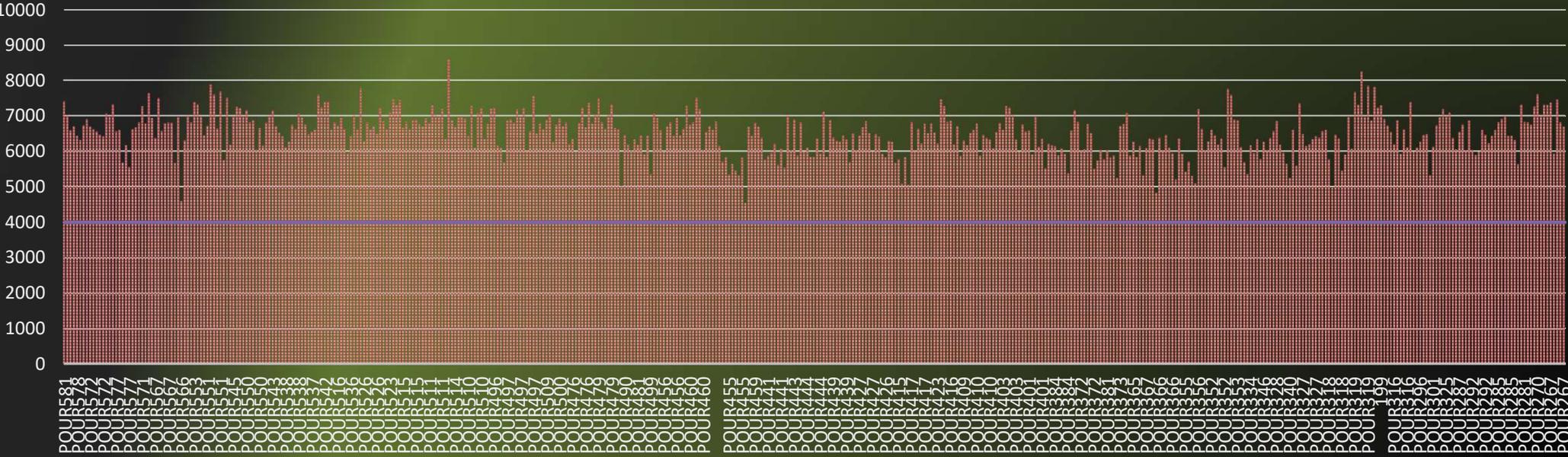
**binni**  
concrete

Mix Design	Description	Delivered Volume	Theoretical Volume	Accepted Volume	# Tests Actual	# Tests Required * Delivered Volume	Notes
NB-MX-3K1-F25-BRG	3500 PSI	1080	780	1020	25	22	Mix Completed
S3W-N35-4-15	Mix #3 Foundations	734	710	717	47	15	
NB-MX-3KM-F45-19	3500 psi MASS HNBA3M01	1062	959	1022	21	21	Mix Completed
S6W-N50-4-40	S6W-N50-4-40	275	265	275	18	6	
NB-MX-3K1-F25-19	3500 psi	1574	1437	1546	43	31	Mix Completed
NB-MX-6K1-F25-BRG	4500 PSI. HNBA6001	859	806	808	54	17	
NB-MX-3KM-F45-BRG	3500 PSI. HNB 3M01	12695	11763	12062	232	211	Mix Completed
NB-MX-6K1-F25-19	HNB6001 4500 psi	298	183	146	10	6	Mix Completed
NB-MX-6K2-F25-BRG	6001 deck mix with fibers 4500 psi	22847	22245	22202	540	456	
S4W-N25-4-5	MIX #4	139	122	124	12	3	
NB-MX-SCC-T20-BRG	8000 Mix	287	289	287	14	6	SCM NCR 158, 139 (Mix Completed)
NB-MX-3KM2-F45-BRG	3500 PSI. HNBA3M02	16180	14034	15827	403	323	SCM NCR 143
NB-MX-6K4-SF-F25-19	Mix 6 Slip Form mix for Roadway	105	80	105	3	2	
S3W-N50-4-17	S3W-N50-4-17	8	8	8	1	1	
NB-MX-6K3-SF-F25-BRG	Mix 6 Slip Form W/ Fibers for Bridge	4673	4641	4642	115	94	
6012-01A-2021	VDOT A3 Mix	77	72	75	8	2	
NB-MX-SCC2-T20-BRG	SCC2 Mix 8000 psi	658	585	648	22	14	
6012-01-2022	VDOT A3 Mix 3500 psi	130	125	115	12	3	
NB-MX-6K5-F25-BRG	4500 Bridge Mix	70	68	70	6	2	
NB-MX-6K4-SF-F25-BRG	Mix 6 Slip Form Mix w/ Fibers for Bridge	99	99	99	2	2	
	<b>TOTAL</b>	<b>63850</b>	<b>59271</b>	<b>61798</b>	<b>1588</b>	<b>1236</b>	

\*Testing rate 1 test/ 50 CY except for NB-MX-3KM-F45-BRG is 1 test/ 60 CY per DCR 33

# Mix Design: NB-MX-6K2-F25-BRG

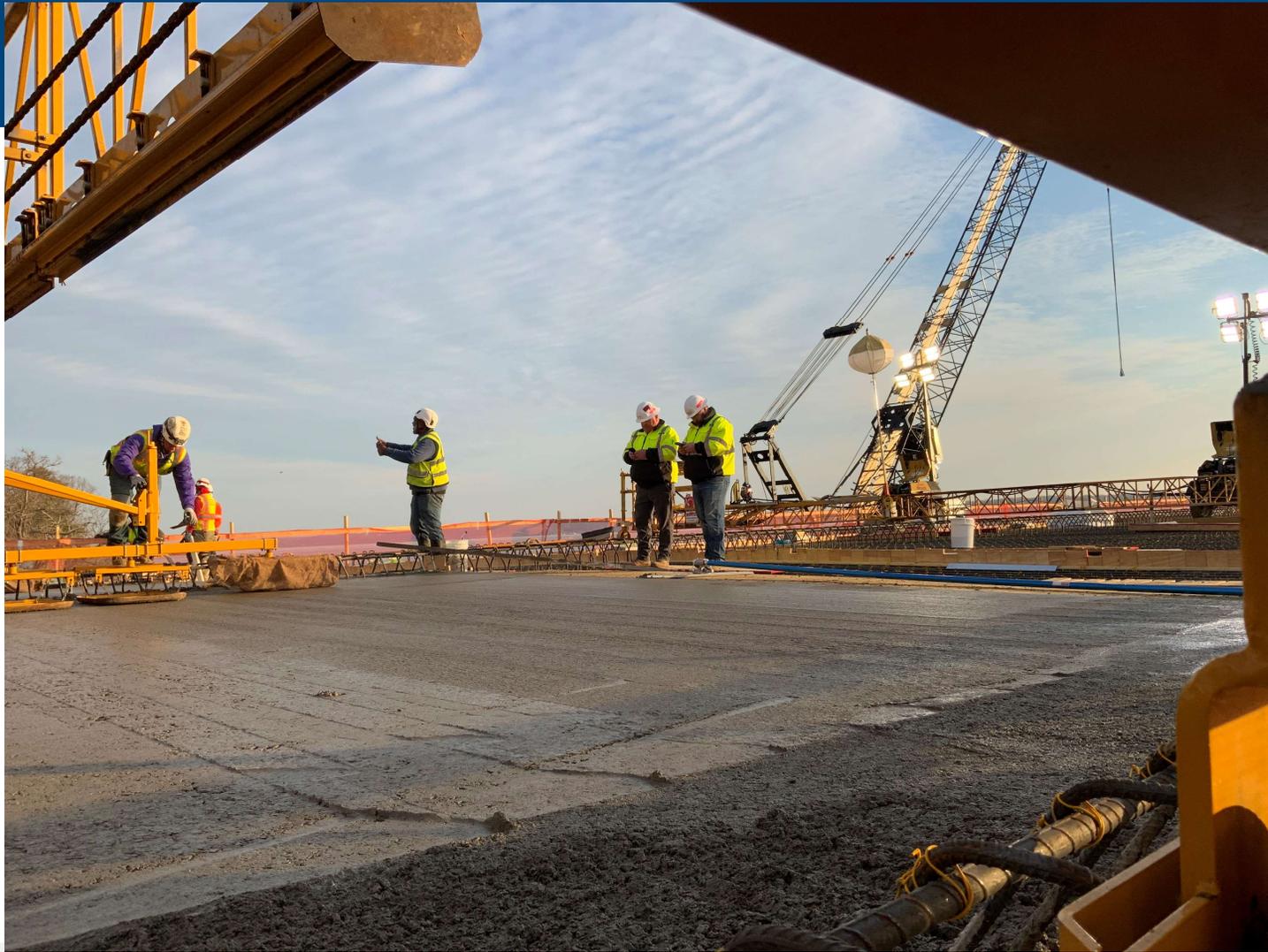
## 28 DAY STRENGTHS - COMPRESSIVE STRENGTH TEST



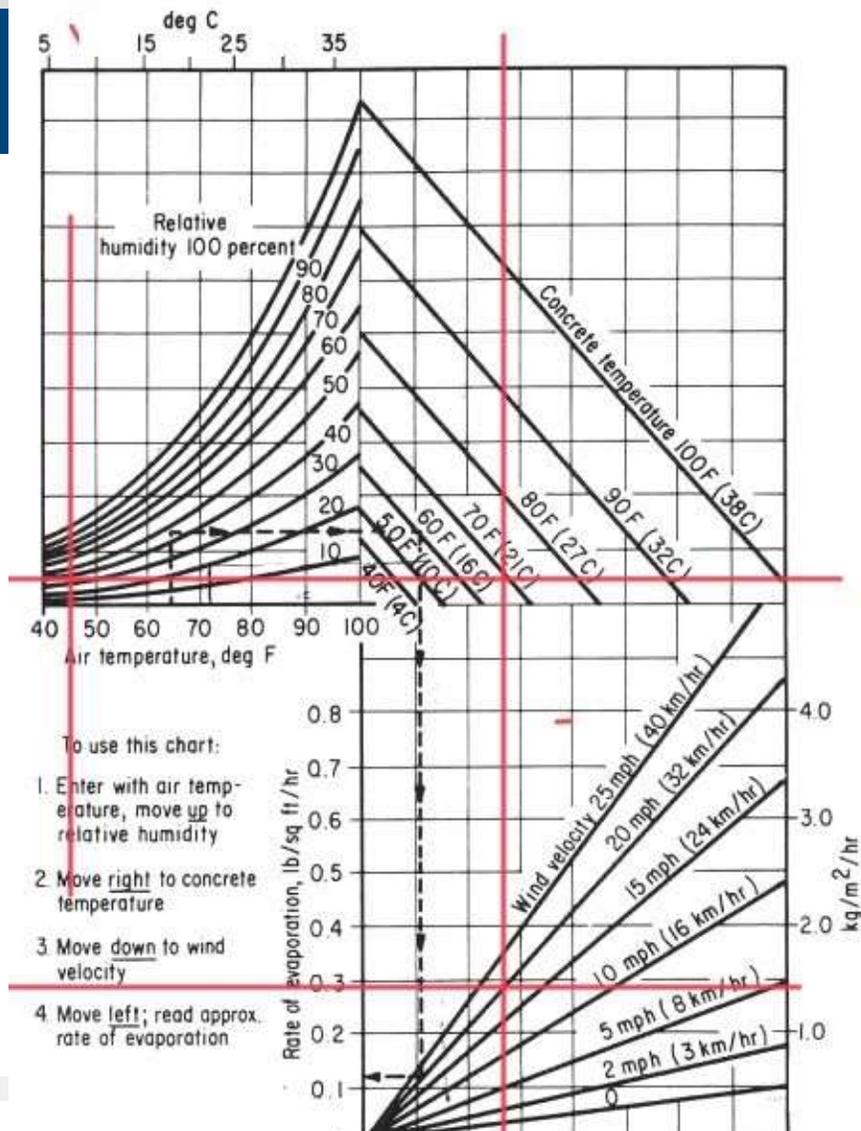
■ 28 Day Strength - Compressive Strength Test    — Min Strength



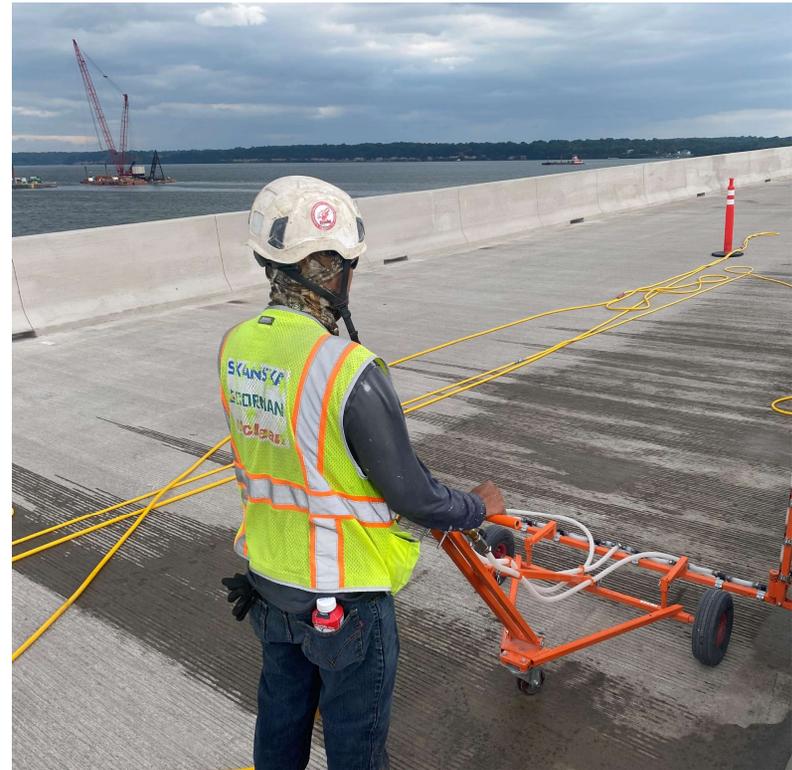








# Crack sealing and deck seal



# Deck flatness



- Rolling straight edge

# Modular joint inspections



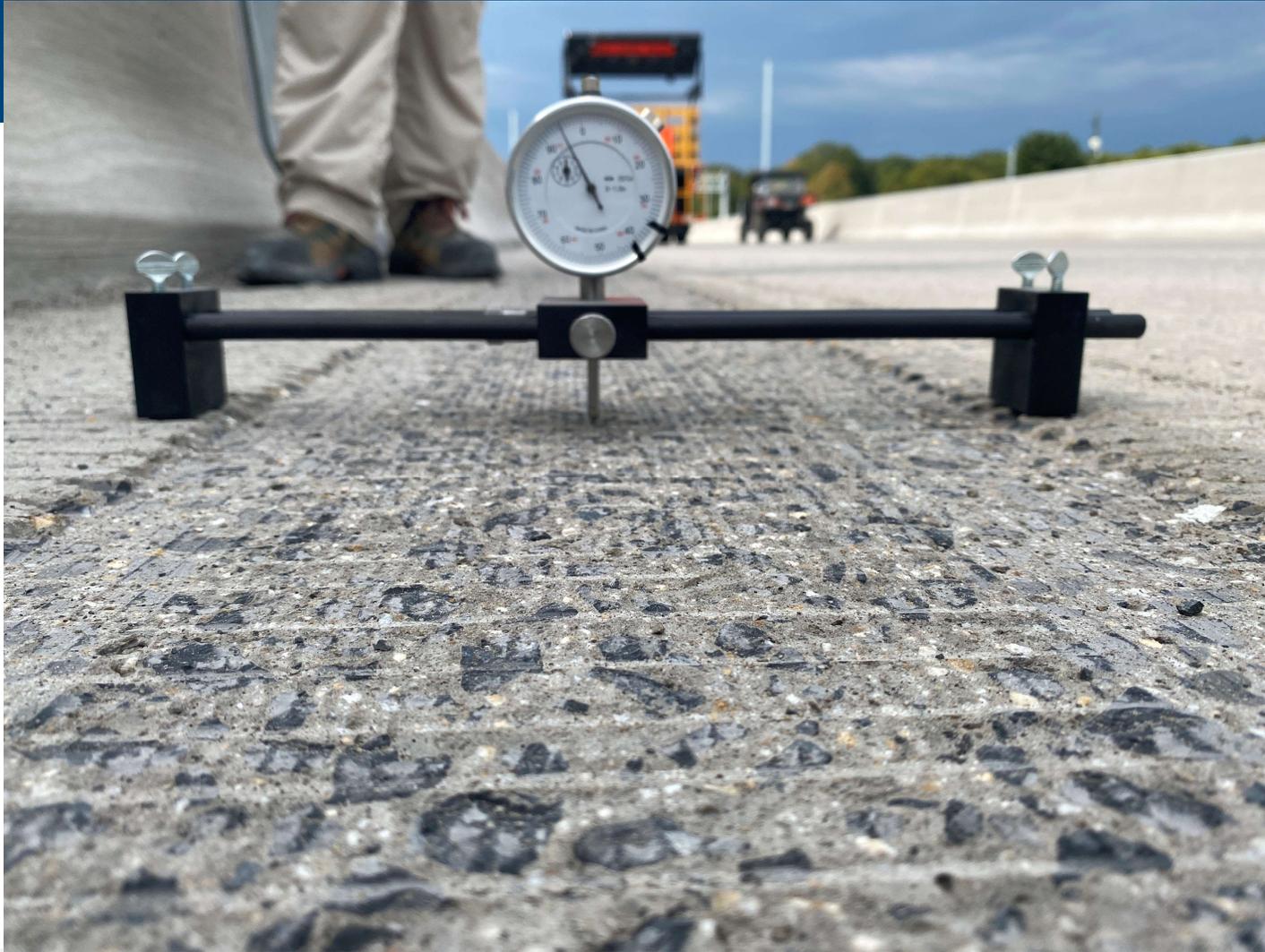
- Coordination with SHA Materials

## ALL-ELECTRONIC TOLLING

- The new Nice/Middleton Bridge is now all-electronic (cashless)
- Motorists pay tolls via *E-ZPass*, Pay-by-Plate, or Video Tolling
- Visit [DriveEzMD.com](http://DriveEzMD.com) for a list of locations to purchase an *E-ZPass*
- Benefits of all-electronic tolling:
  - Save up to 77% with Maryland *E-ZPass*
  - Free transponders and no monthly fees
  - Less idle time results in better fuel efficiency and savings at the pump
  - Faster commutes with less congestion and increased reliability
  - Increased safety and fewer crashes







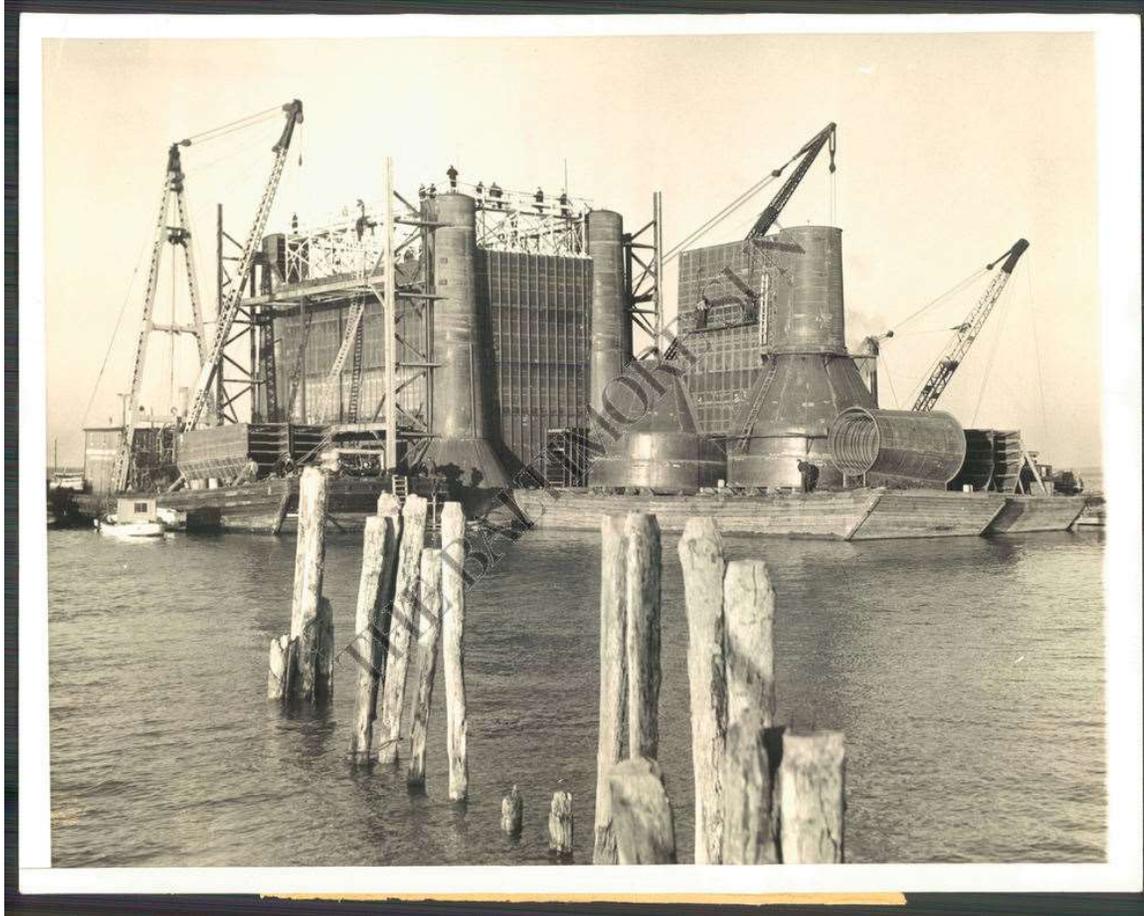


# Demolition Overview Schedule

- Fender Removal - Complete
- Deck Saw Cutting - Now through March 2023
- Deck Surface Removal – November 2022 through June 2023
- Low Level Removal – Now through September 2023
- Beam and Truss Removal – January 2023 through September 2023
- Pier Demolition and Removal – January 2023 through October 2024



# Existing Bridge Demolition



# Quality – it works



## CONSTRUCTION TIMELINE

- Opening almost three months **ahead of schedule and on budget**
- We built the wider, safer, better new bridge fast and with high-quality construction



# Nice Middleton Bridge Open 10/12/22

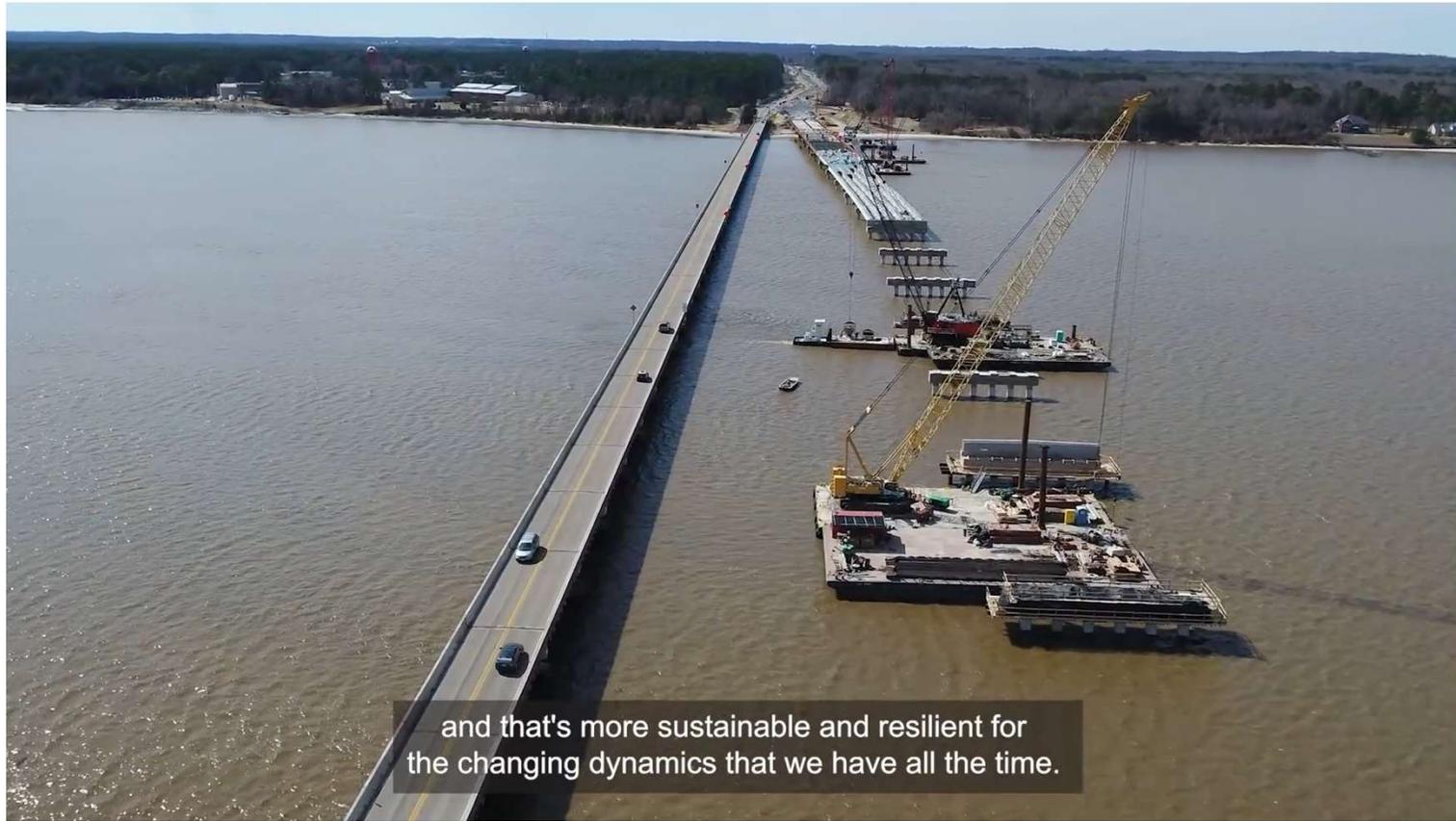




Track and visit us at:  
[Newnicebridge.com](https://www.newnicebridge.com)

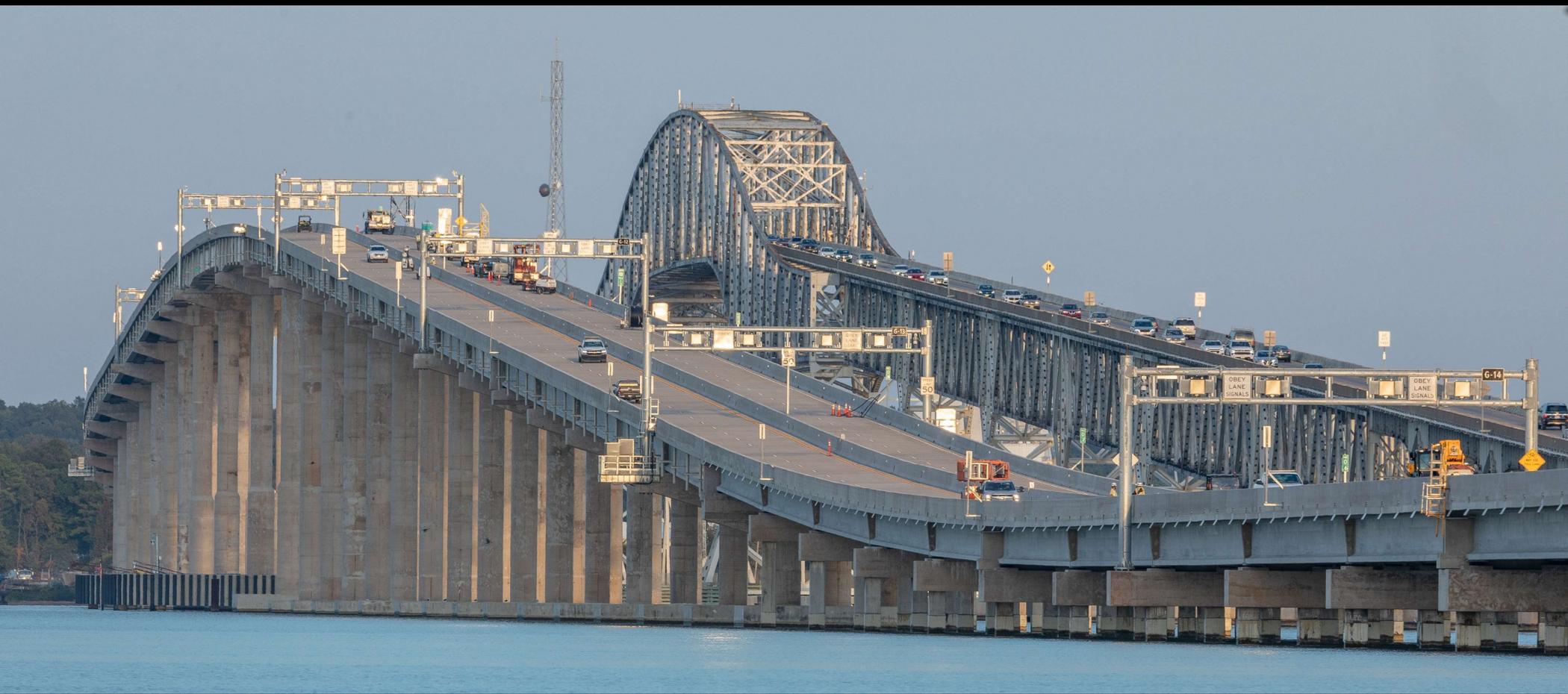
<https://mta.maryland.gov/NiceMiddletonBridge/Home>

# Success Factors



and that's more sustainable and resilient for the changing dynamics that we have all the time.

**#MdQI**



# Project Resources

- Link to New Nice Bridge video: Gallery - [Gallery - New Nice Bridge Project | MDTA \(maryland.gov\)](#) (note: the 11/22/2022 video shown for the presentation is not posted on the web site as of this date.)
- Coastal Precast Systems, LLC: Gary Shrieves, [gshrieves@cpsprecast.com](mailto:gshrieves@cpsprecast.com), 757-545-5215
- SIVA Corrosion Services, Inc. (NTBuild structure modeling/ Corrosion Protection Plan): Siva Venugopalan, [siva@sivacorrosion.com](mailto:siva@sivacorrosion.com), 610-692-6551
- MJ2 Consulting (mass concrete thermal control plan): John Gajda, [john@mj2consulting.com](mailto:john@mj2consulting.com)
- Foundation Test Group, Inc. (vibration monitoring and ground improvements): Kevin Tehansky, [ktehansky@foundationtestgroup.com](mailto:ktehansky@foundationtestgroup.com)
- RTK rover/ ARCGIS/ Bentley iTwin: Tom Earp, RK&K, [tearp@rkk.com](mailto:tearp@rkk.com), 410-462-9110
- Binni (concrete testing application): Wes Morrison, [wes@binni.co](mailto:wes@binni.co), 571-524-2484
- Exact (concrete temperature monitoring): Stacia Van Zetten, [stacia@exacttechnology.com](mailto:stacia@exacttechnology.com), 647-812-0248
- Earthcam: Lia Staikova, [lstaikova@earthcam.com](mailto:lstaikova@earthcam.com), 201-488-1111 x1513
- PlanGrid (training and standardization): Alex Butcher, [alex.butcher@autodesk.com](mailto:alex.butcher@autodesk.com), 281-788-1574
- 3M rep (road and bridge pavement markings): Josh Thomas, [jthomas2@mmm.com](mailto:jthomas2@mmm.com), 800-553-1380, [www.3m.com/RoadSafety](http://www.3m.com/RoadSafety)
- Forneyvault (wireless cylinder break reporting & integration): Scott Grumski, [sgrumski@forneyonline.com](mailto:sgrumski@forneyonline.com), 724-551-1140, [www.forneyvault.com](http://www.forneyvault.com)
- NRMCA (National Ready Mix Concrete Association; Independent concrete testing/ research): Stuart Sherman, 240-485-1173, [ssherman@nrmca.org](mailto:ssherman@nrmca.org)

**NEW NICE BRIDGE**

