Innovative Pavement Options for Resiliency

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National Pavement Preservation Conference
nppc23
IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION
September 18-21 • J.W. Marriott Hotel • Indianapolis, Indiana

ncpp
National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

AASHTO TSP2 PAVEMENT PRESERVATION
ROCKY MOUNTAIN WEST PAVEMENT PRESERVATION PARTNERSHIP
SOUTHEAST PAVEMENT PRESERVATION PARTNERSHIP
MIDWESTERN PAVEMENT PRESERVATION PARTNERSHIP
NORTHEAST PAVEMENT PRESERVATION PARTNERSHIP

Roadway Flooding Challenges

- More and more concerns/inquiries from the public
- Some storm-related, some not ("sunny day flooding")
- Caused by low-lying nature of the state
- Additional factors include:
  - Tide cycles
  - Wind speed/direction
  - Sea level rise
  - Land use

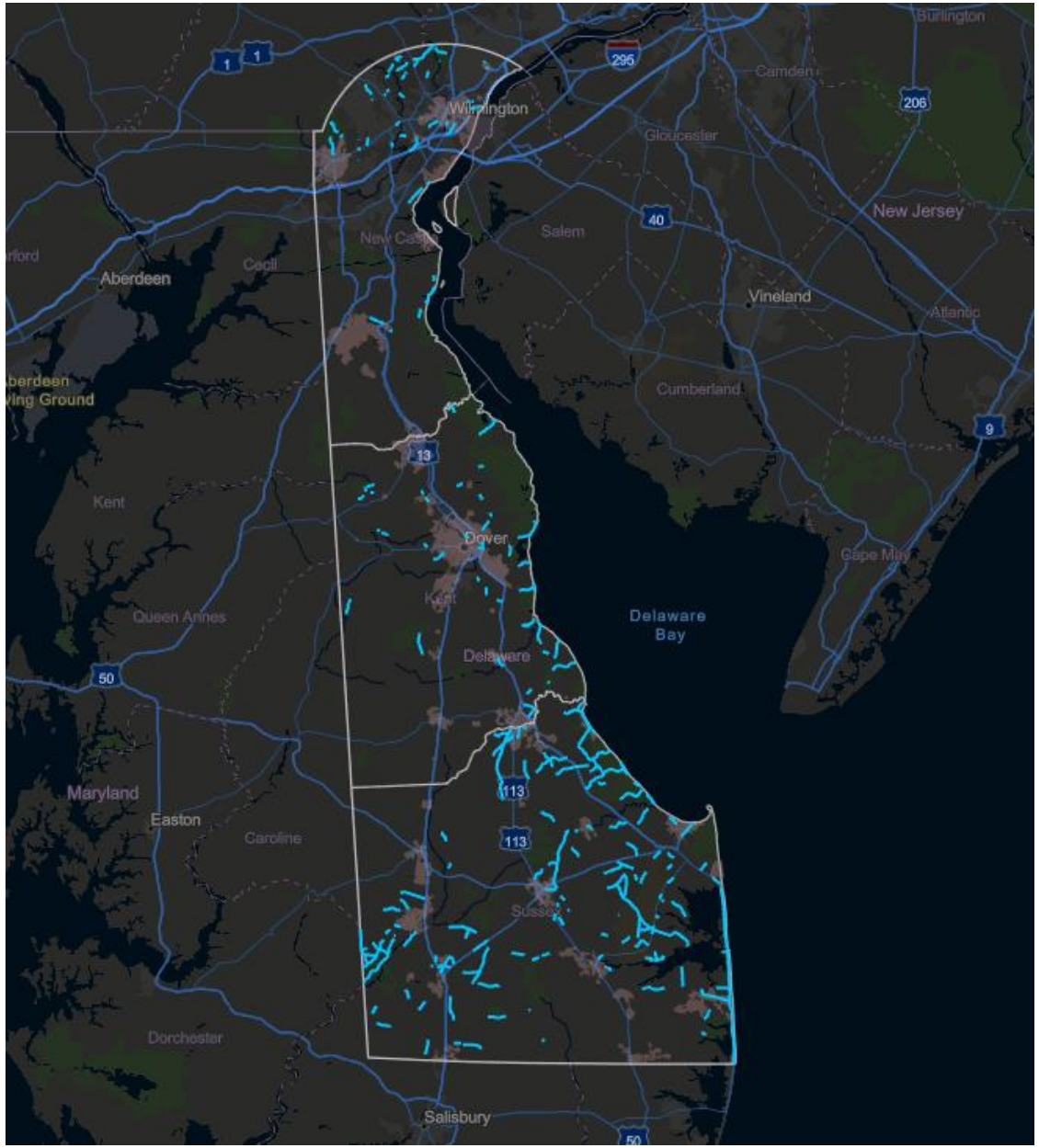
Possible Mitigation Options

- Tolerate
- Relocation/Realignment
- Elevate
- Harden
- New, innovative solutions
- Strategic (Managed) Retreat
  - Abandon
  - Buy-outs

Roadway Flooding Challenges

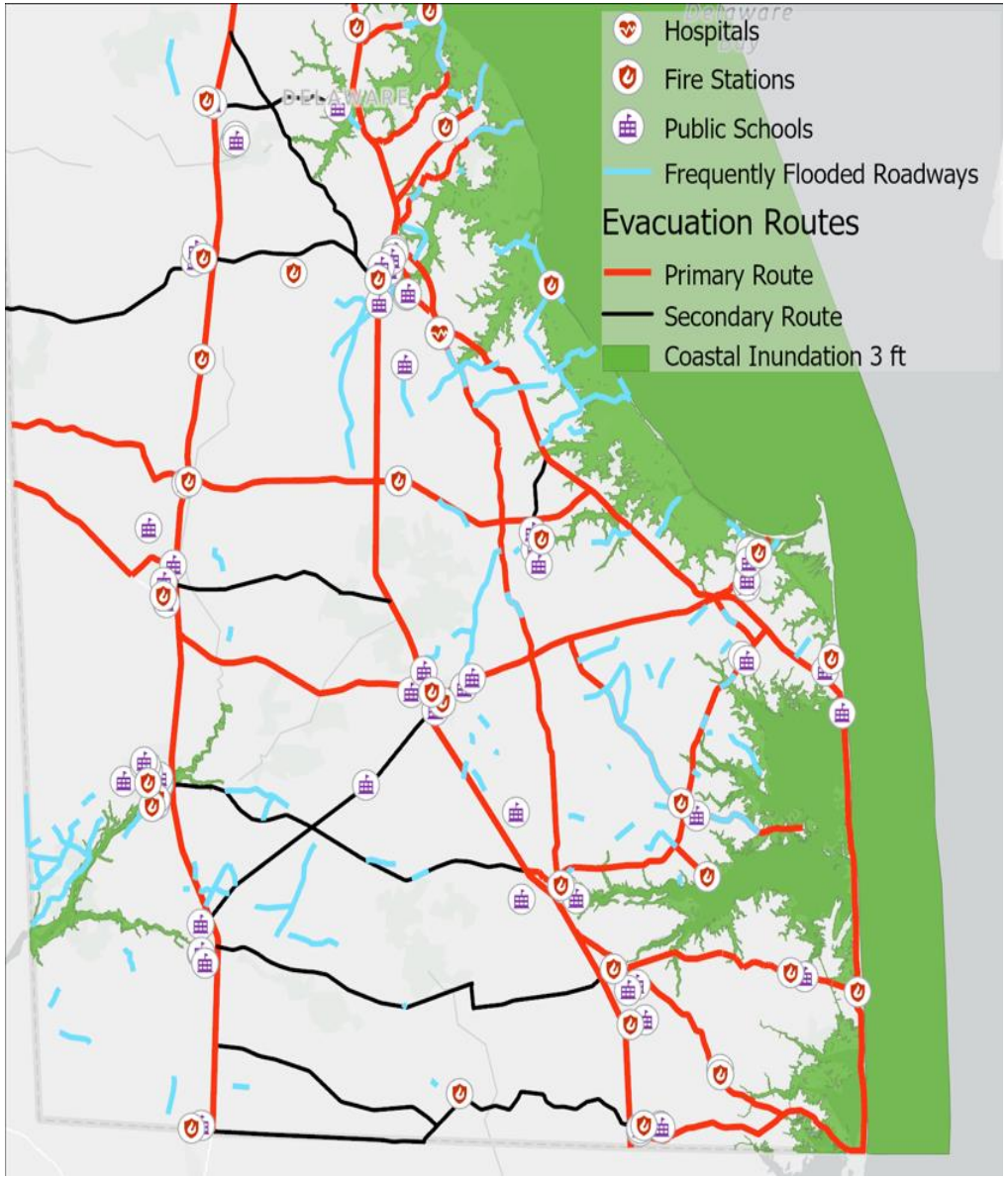
Due to the low-lying topography of the state, creating resilient infrastructure in the face of roadway flooding becomes a challenge. We have been, and continue to be, challenged by the effects of sea level rise and **frequently flooded roadways*** across the state.

*250+ miles identified statewide

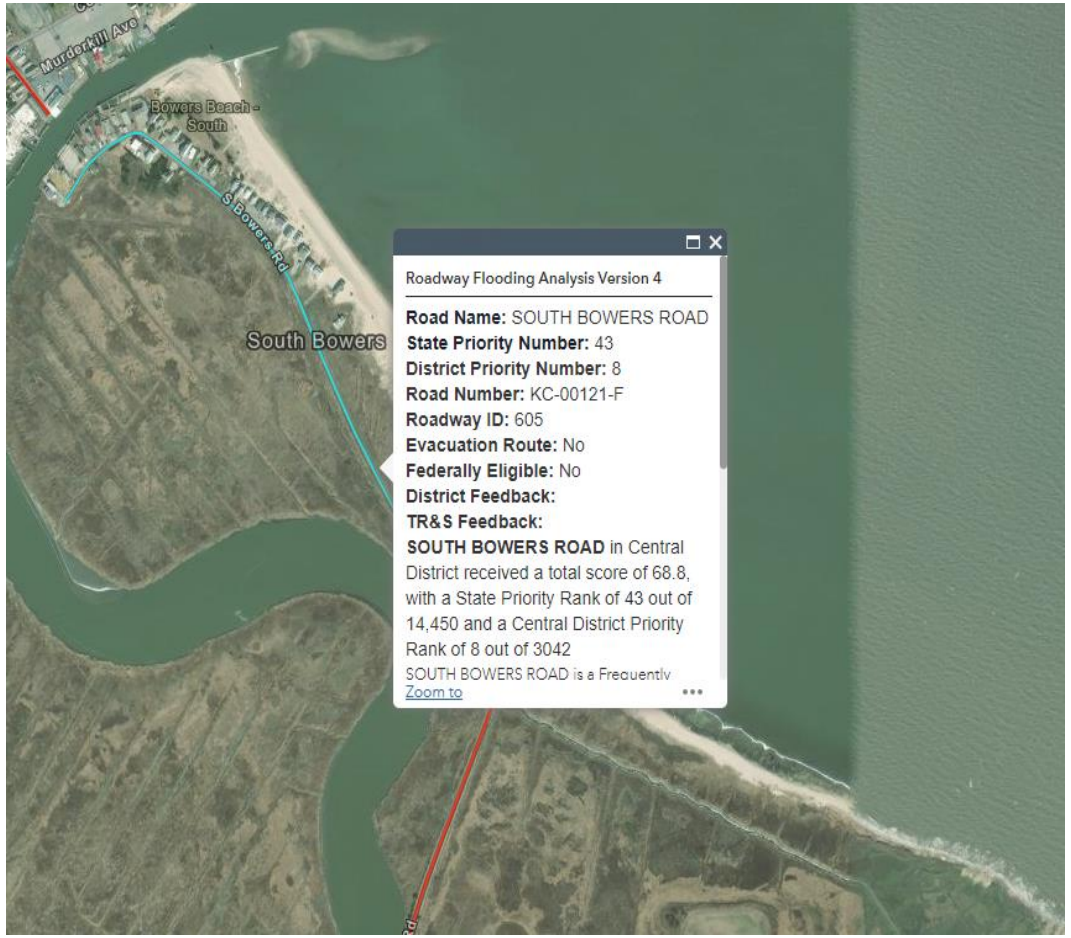


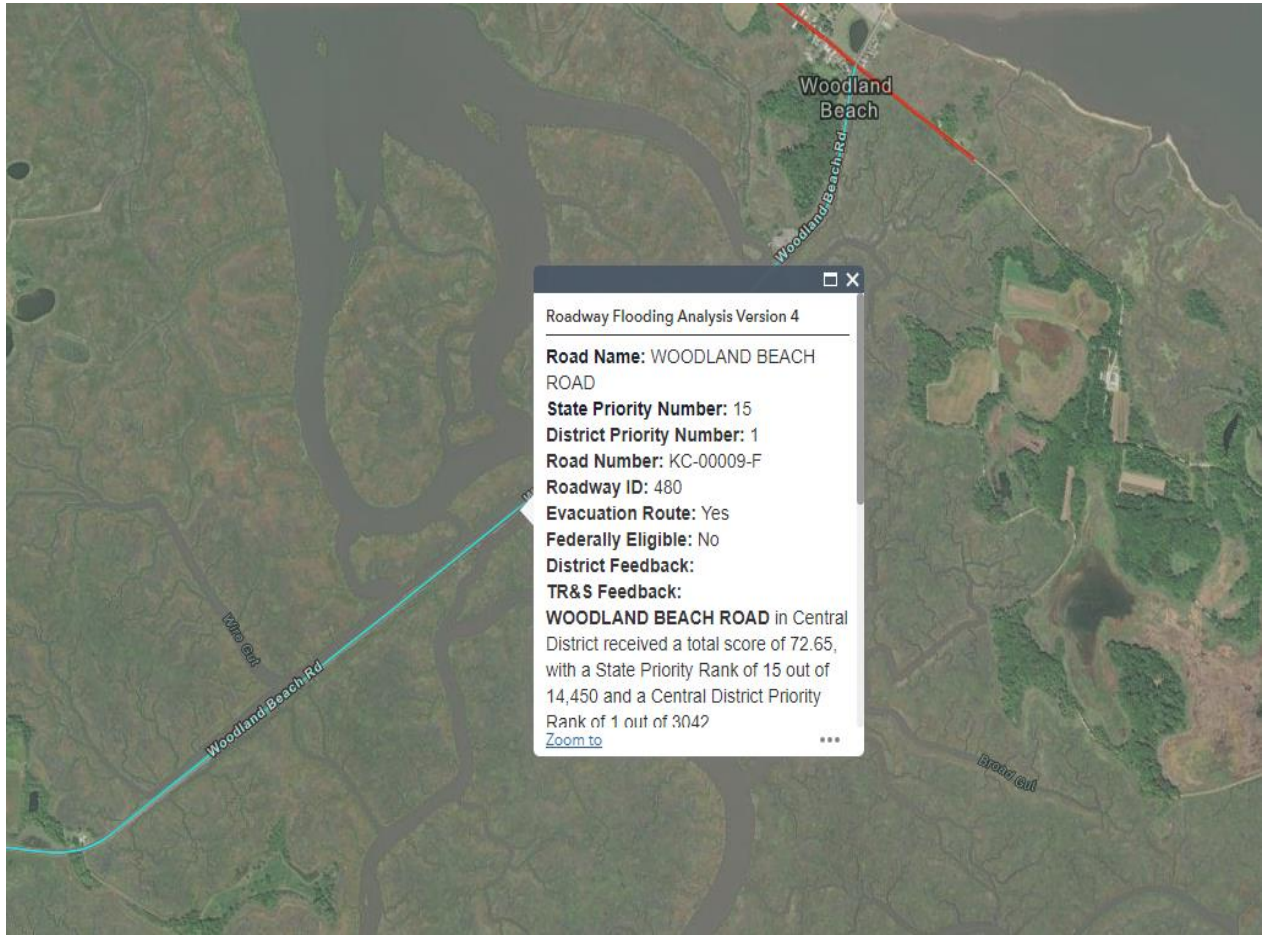
Frequently Flooded Roadways

- Prioritize segments
  - Strategic transportation network
  - Impact on public/social disruption/economic justice
  - Roadway flooding characteristics/conditions



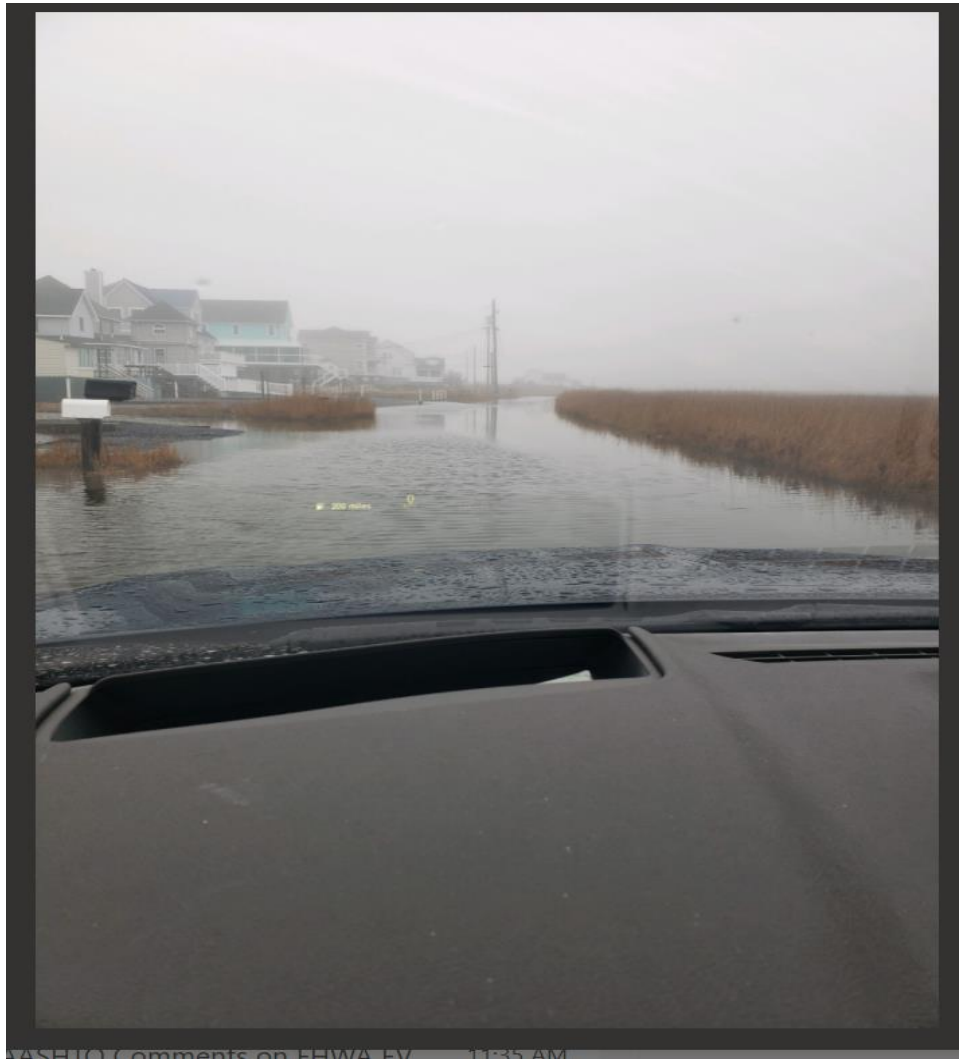
Segment Prioritization





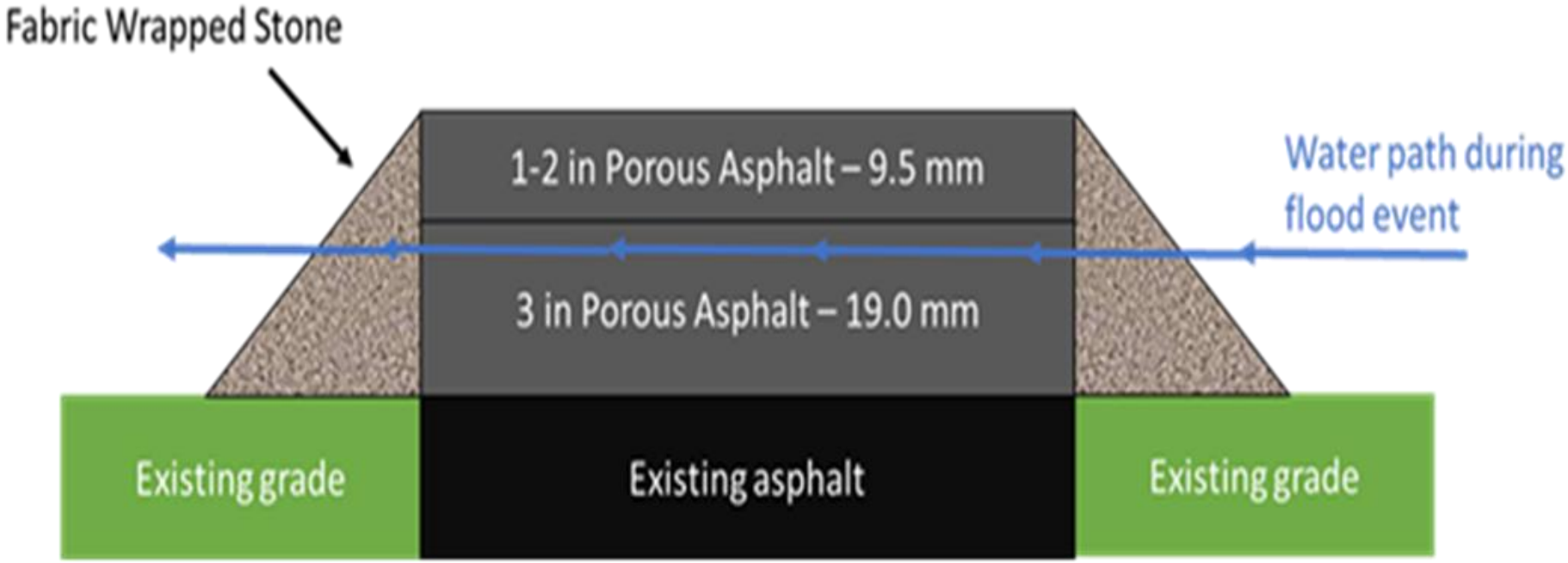
Innovative Roadway Elevation Options

- South Bowers Road
  - Small, local, one-way-in, one-way out roadway to beach community (36 homes)
  - Significant roadway overtopping at times
  - Short-term solution is to elevate roadway … by how much?
    - **Encroaching wetlands along roadway; limited construction area**
    - **Build on existing roadway footprint**
    - **Roadway settlement concerns with additional overlay**



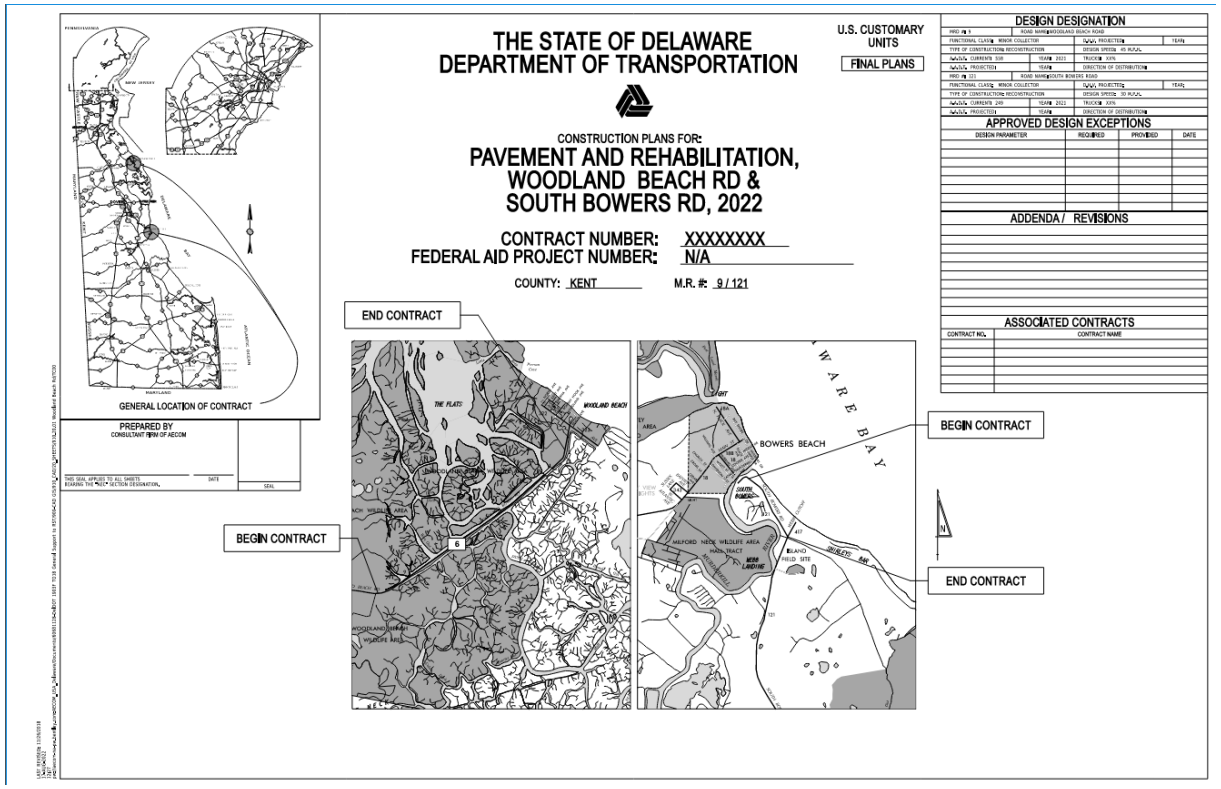

Wyatt St
Cooper Ave
Bowers Beach
Davidson St
Bayview Tavern
JP's on the Wharf
Temporarily closed
Davidson St
Rd 121
S Bowers Rd
Rd 121
Webbs Cut-Off
Shirleys

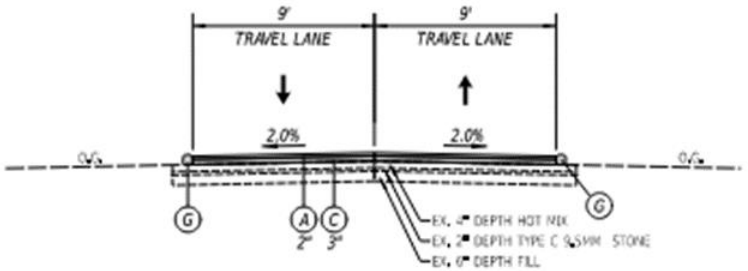
South Bowers Road



Plan Development

- ~ 0.75 miles of pavement overlay
- 3” 19.5 mm Pervious Pavement + 2” 9.5 mm Pervious Pavement
- **Item for edge drop-off**
- Engineer’s Estimate: ~$746,000 (state funds)





SOUTH BOWERS RD

SURFACE PREPARATION SHALL BE AS PER 401.3 H BUT TACK COAT SHALL BE PG 64-22 APPLIED PER TABLE 401-B

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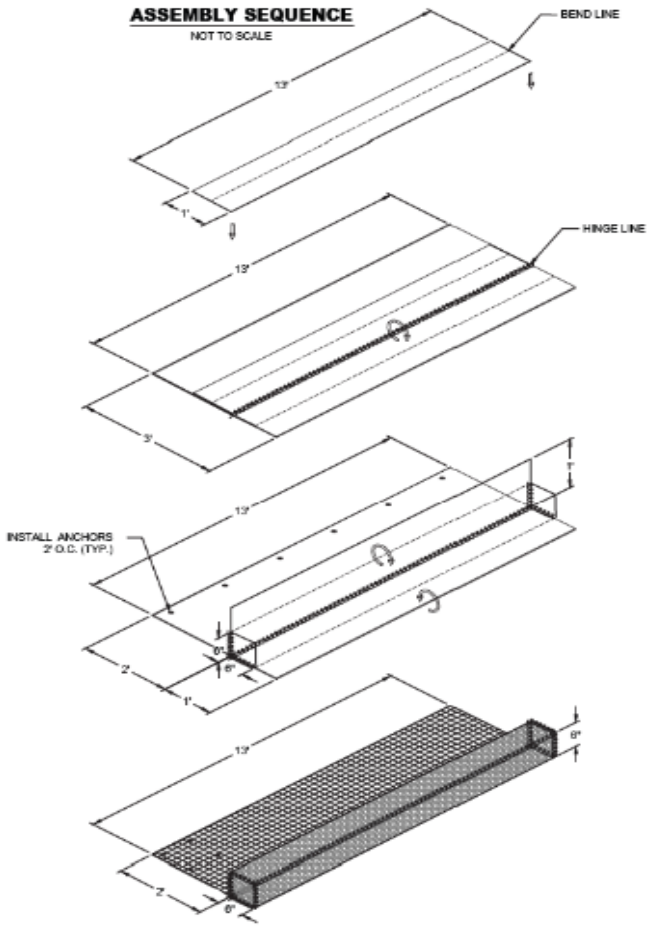
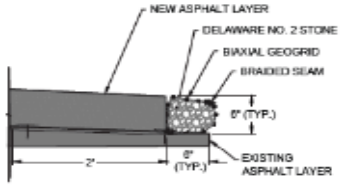
ASSEMBLY SEQUENCE

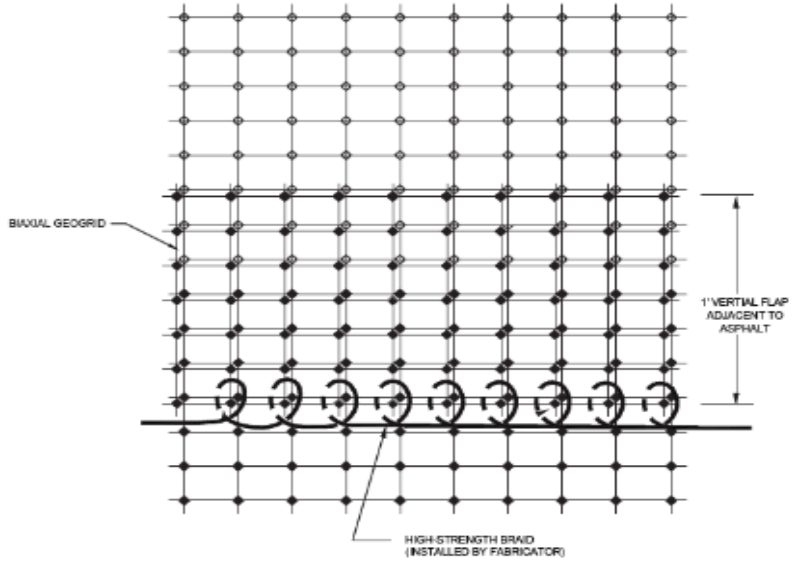
NOT TO SCALE





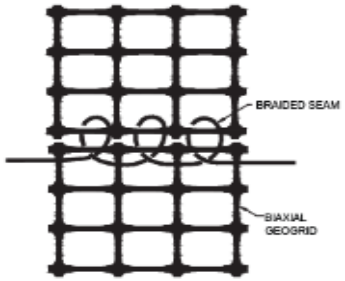
TYPICAL ASPHALT ANCHOR SECTION

NOT TO SCALE



LOCATION OF BRAID

NOT TO SCALE



1. ALL CUT ENDS OF BRAID MATERIAL SHALL BE KNOTTED WITHIN 1/2" TO 2" OF THE END TO PREVENT RAVELING OF BRAID.
2. AT ALL ENDS OF ALL BRAIDED SEAMS THE BRAID SHALL BE SECURELY KNOTTED TO THE GEOGRID.
3. AT ALL ENDS OF ALL PIECES OF BRAID MATERIAL USED, THE BRAID SHALL BE KNOTTED TO SPLICE IT TO THE NEXT PIECE OF BRAID, OR TO SECURE IT TO THE GEOGRID. EACH BRAIDED SEAM SHALL BE CONTINUOUS, WITH SECURELY KNOTTED SPLICES ALLOWED. THE BRAID SHALL BE SECURELY KNOTTED TO THE GEOGRID AT A SPACING NOT TO EXCEED 6 FT ALONG ANY SEAM.
4. THE BRAID SHALL BE STITCHED THROUGH EACH PAIR OF APERTURES ALONG THE SEAM AT LEAST ONCE, AND THE MINIMUM NUMBER OF STITCHES PER FOOT ALONG THE SEAM SHALL BE SIX (6). THE SPACING OF STITCHES ALONG EACH SEAM SHALL BE REASONABLY UNIFORM.
5. ALL KNOTS SHALL BE TIED IN A MANNER TO PREVENT SLIPPING AND CLINCHING.
6. THE WRAPS ALONG THE SEAM SHALL BE SUFFICIENTLY TIGHT TO CLOSE THE GAP BETWEEN THE ADJACENT PIECES OF GEOGRID, BUT SHALL NOT BE OVER-TIGHTENED SUCH THAT THE GEOGRID BINDS ALONG THE SEAM.

TYPICAL STITCHED SEAM DETAILS

NOT TO SCALE

ITEM 707512 - POLYMERIC FILTER MATTRESS

NOT TO SCALE

AECOM

ADDENDA / REVISIONS		NOT TO SCALE	PAVEMENT AND REHABILITATION WOODLAND BEACH RD & SOUTH BOWERS RD, 2022	CONTRACT	BRIDGE NO.	N/A	CONSTRUCTION DETAILS	SECTION
				TXXXXXXXXX	DESIGNED BY:	A. Mallah		AEC
				COUNTY	CHECKED BY:	L. Hohstee		SHEET NO.
				KENT				38

Plan Development

Geotextile “Filter” and Edge Drop-Off Protection

South Bowers Road

South Bowers Road

South Bowers Road

Creek
Duck Creek
Woodland Beach
Woodland Beach
Smyrna Delaware
6
Woodland Beach Rd
6
9

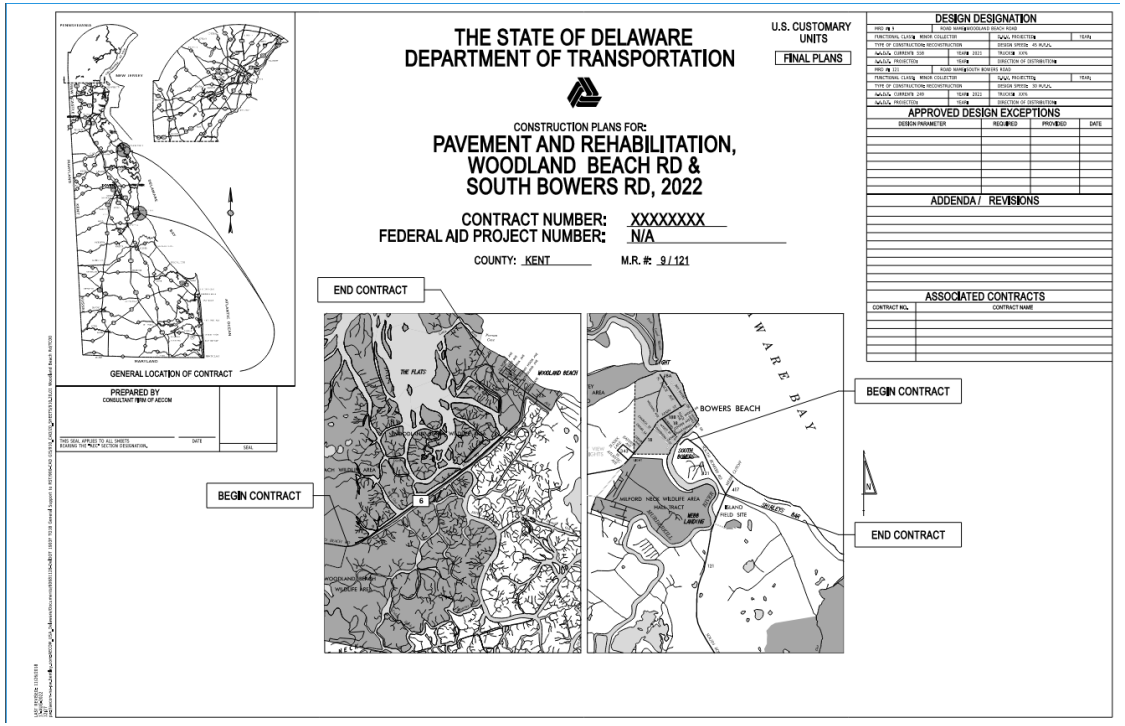

Woodland Beach Road

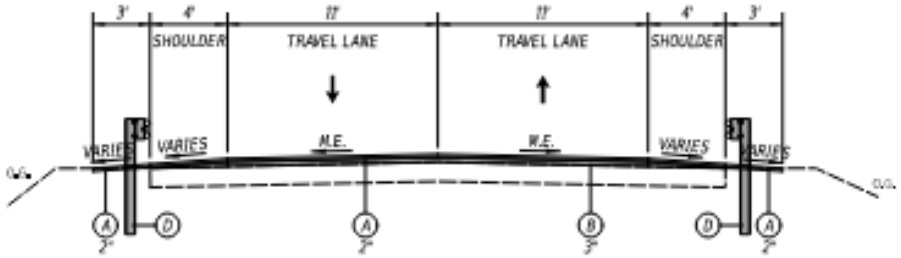
Woodland Beach Road

- One-way-in, one-way-out access road to beach community (48 houses)
- Roadway sees many overtopping events
- Have been past evacuations of community
- "**Water on Road**" warning sign system is active
- Working with UD on low-cost sensor deployment
- Longer term solution sought
  - Underlying soil stabilization
  - Lightweight aggregate fill to raise roadway

Plan Development

- ~ 2 miles of pavement overlay
- 3” 19.5 mm Pervious Pavement + 2” 9.5 mm Pervious Pavement
- No edge drop-off concerns; just A LOT of guardrail
- Guardrail and utility adjustments
- Engineer’s Estimate: ~$4.2M (state funds)





WOODLAND BEACH RD
PARKING AREA TO WESTERN PROJECT LIMIT

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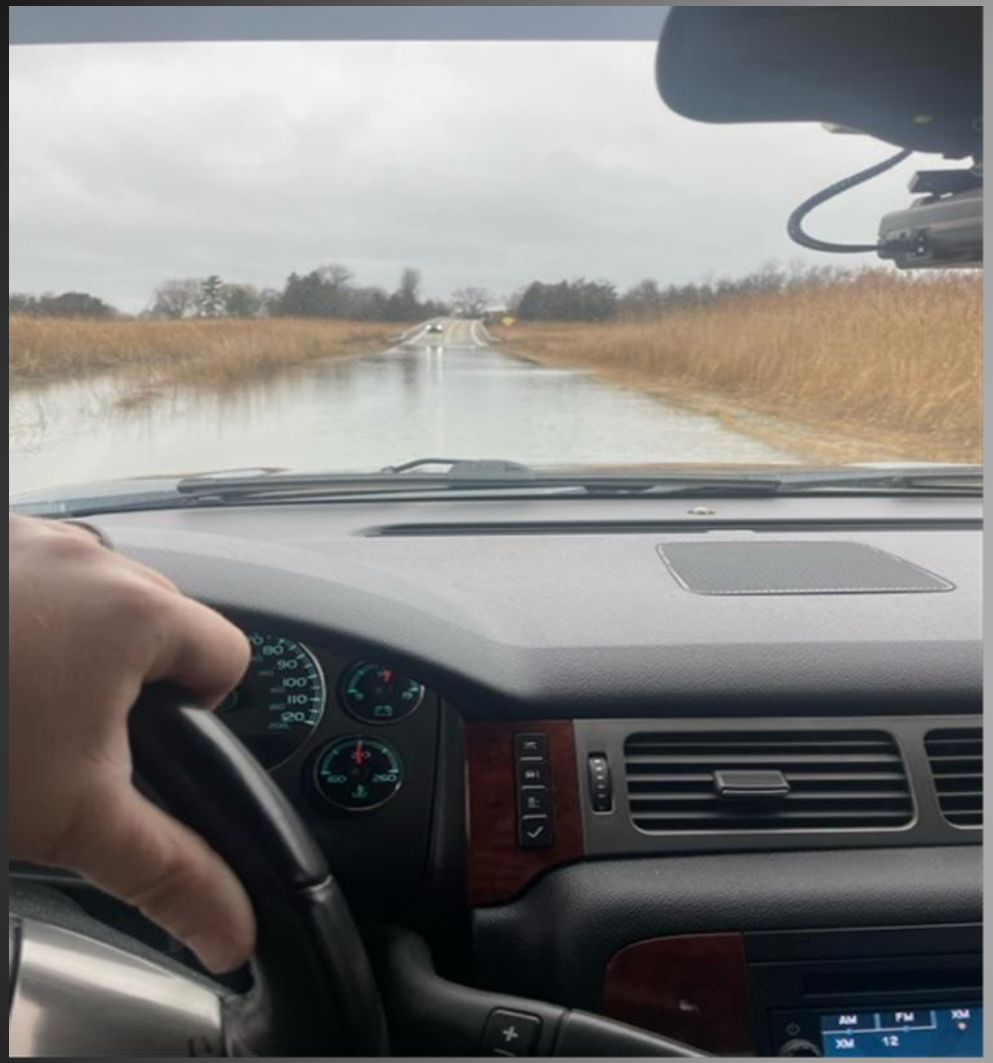
Woodland Beach Road



Thank you for your time and attention

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