



# DELDOT'S SYSTEMIC SAFETY IMPROVEMENT PROGRAM

## HIGH FRICTION SURFACE TREATMENTS



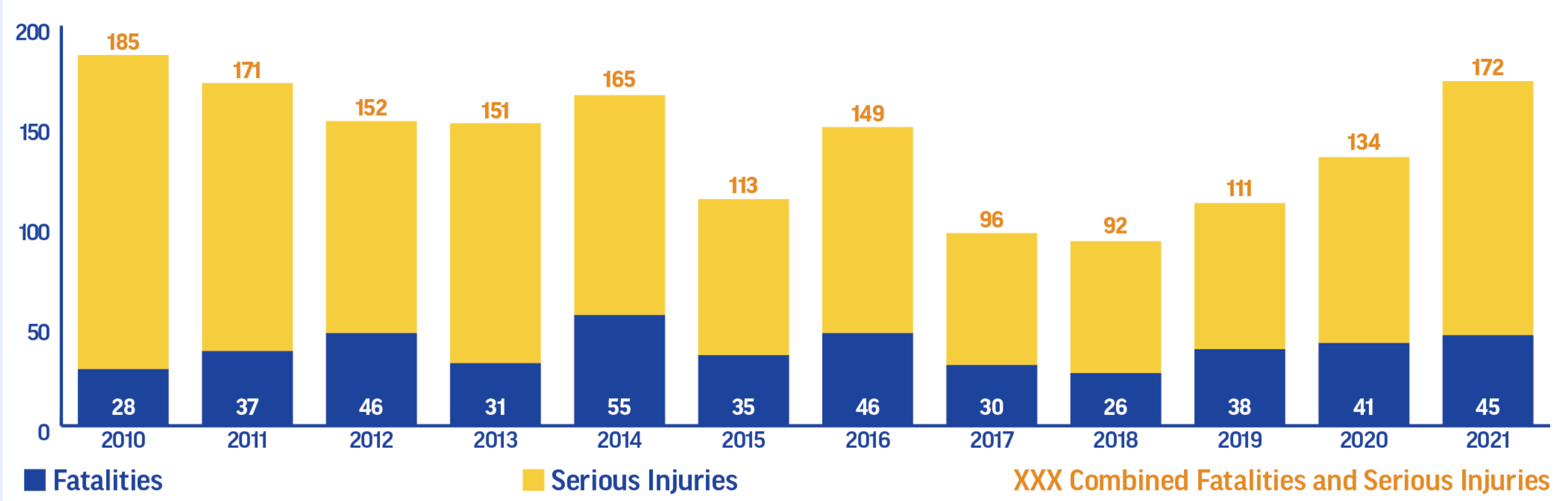
Addressing Delaware's Strategic Highway Safety Plan (SHSP) Roadway Departure Emphasis Area by targeting the reduction of fatal and serious injuries resulting from roadway departure crashes

### BACKGROUND

The intent of DelDOT's Systemic Safety Improvement Program is to identify candidate locations expected to benefit from the implementation of specific safety improvements. Based on the 2021-2025 Delaware Strategic Highway Safety Plan (SHSP), 28% of all fatalities and 16% of all serious injuries occurred in a roadway departure crash (based on 2015-2019 data). Furthermore, wet/snowy/icy pavement has been identified as a major contributing factor in roadway departure crashes, accounting for 20% of all roadway departure fatalities and serious injuries. High friction surface treatments (HFST) are proven to reduce the potential for crashes that occur on wet pavement.

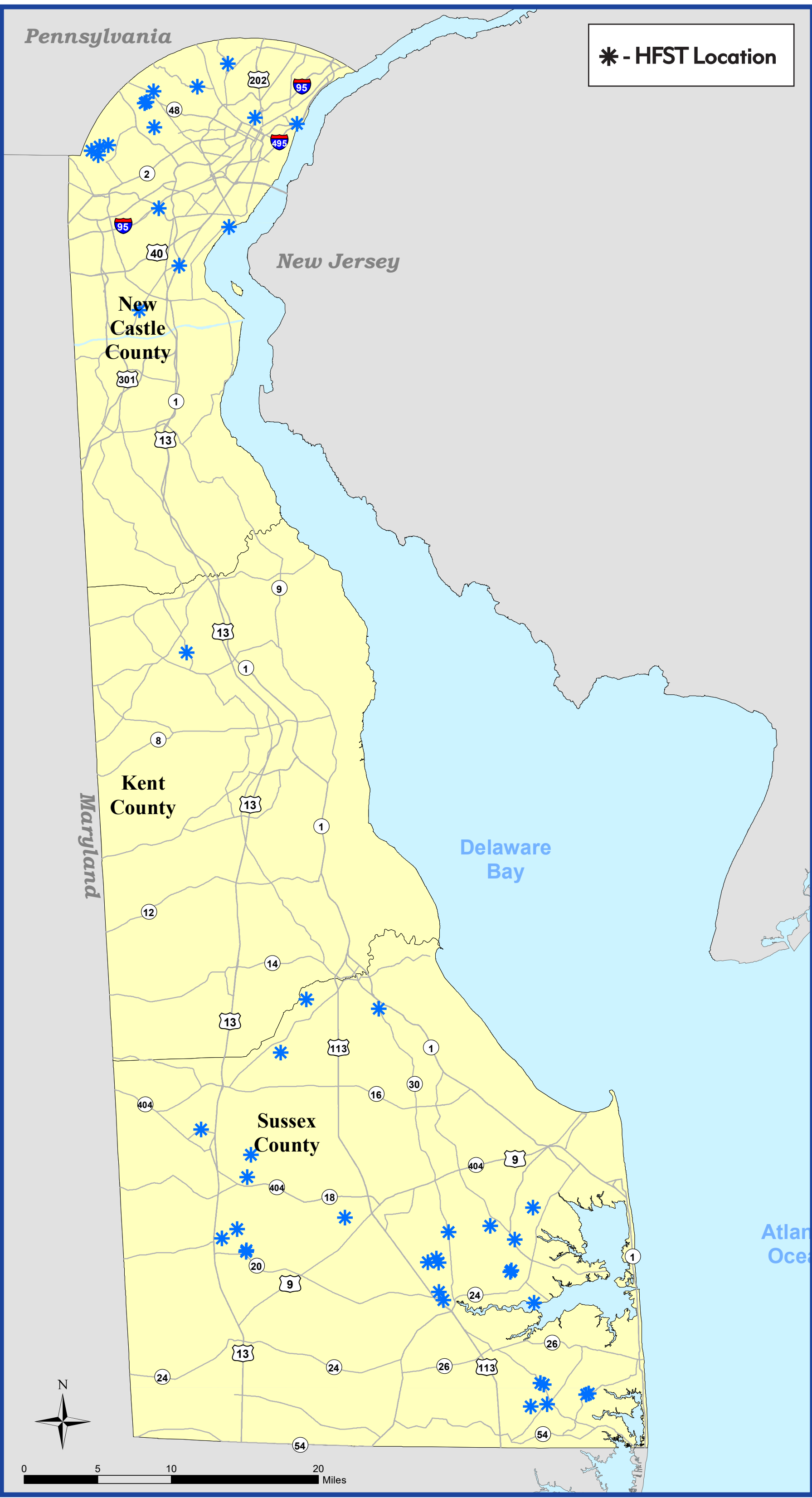
### ANNUAL DELAWARE FATALITIES & SERIOUS INJURIES

EA 4: Roadway Departure



28% OF FATALITIES AND 16% OF SERIOUS INJURIES INVOLVED A ROADWAY DEPARTURE (2015-2019 CRASH DATA)

### SITE SELECTION AND IMPLEMENTATION



DelDOT continuously evaluates crash data and roadway risk factors to identify locations where HFST could have a crash reduction benefit. Site selection evaluation includes a review of wet weather related crash data on all roadways within the state and ranking those roadways with higher than average rates of wet weather crashes and risk factors such as curvature, downgrades, and approaches to intersections. Pavement evaluations are conducted on the top ranked locations to determine if HFST installation is feasible or if other pavement improvements are necessary.



Once the locations are selected and screened, DelDOT issues contracts to HFST installers to place the treatment at the identified locations. DelDOT utilizes Federal safety funds to pay for HFST. As of September 2023, there are 44 locations with HFST across the state, installed on curves, downgrades, and intersection approaches. The treatment has been placed on I-95, I-495 and on local roads. Additional HFST locations are being planned.

### WHAT IS HIGH FRICTION SURFACE TREATMENT?

HFST is a type of ultra-thin pavement overlay that utilizes an epoxy resin binder and a high-quality aggregate. The binder material is applied to a section of pavement and the aggregate is spread over the binder material. The aggregates are polish-resistant and abrasion-resistant, resulting in an improved pavement friction and longer-lasting overall friction. HFST is beneficial in areas where high friction demand is needed, such as within curves, on downgrades, and on approaches to intersections where vehicles must come to a stop.



DelDOT uses an epoxy resin binder that holds the aggregate firmly in position. DelDOT uses a calcined bauxite aggregate that is the most common type of aggregate used in HFST treatments across the country.



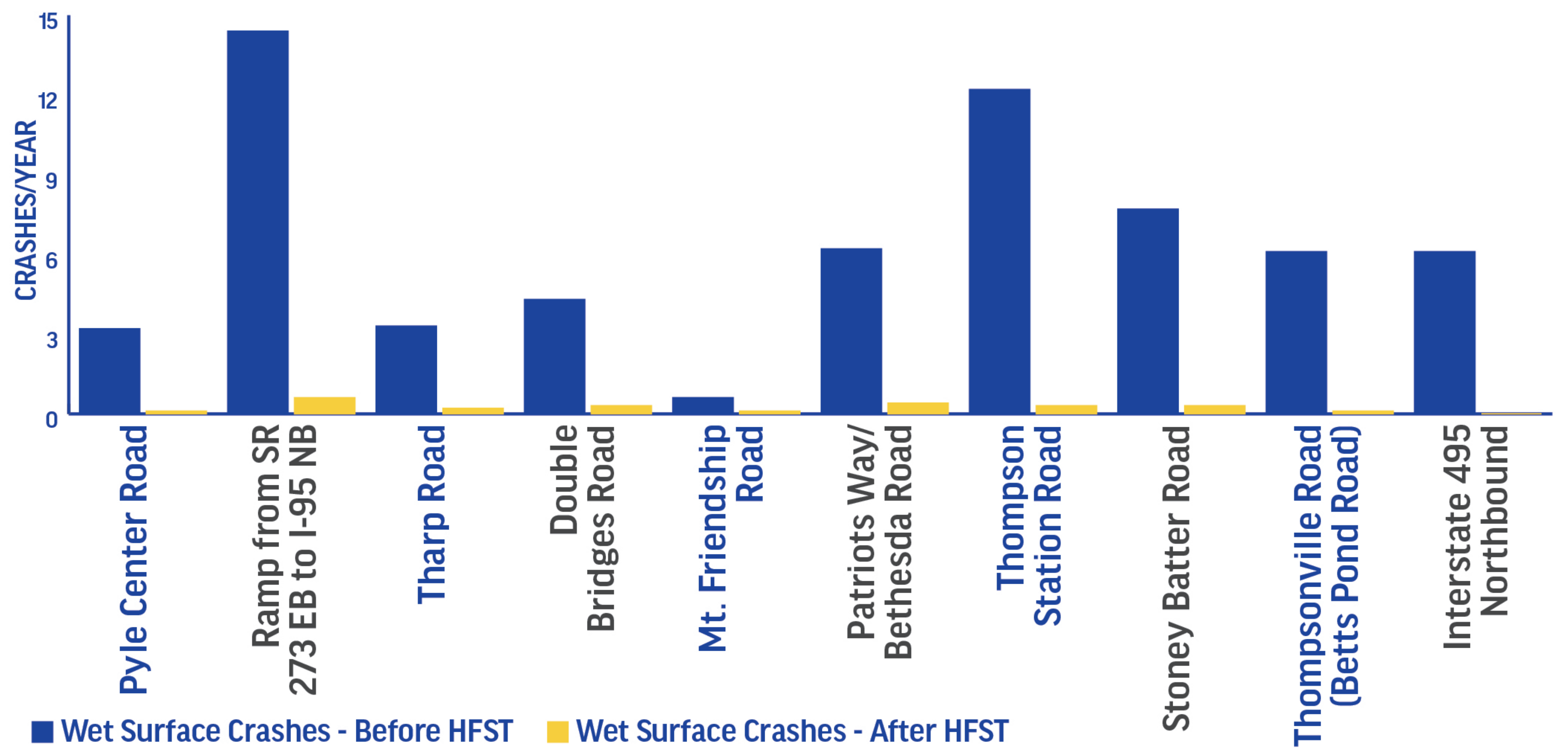
The material is applied using a truck-mounted application machine capable of mechanically mixing, metering, monitoring, and applying the binder resin system and high-friction aggregate in one continuous pass.

### EVALUATION

**Crash Experience:** HFST applications have been implemented on 44 locations since 2015. Crash data, before and after HFST treatment, has been reviewed to determine the effectiveness of HFST. The results indicate the following:

- At 16 of 44 locations, **zero wet-surface crashes** were reported during the after period (which ranges from approximately 1 to 10 years).
- The **total number of wet-surface crashes** per year decreased at all of the locations and by an overall average of **91%**.
- The **total number of crashes** per year decreased at 93% of the locations and by an overall average of **80%**.
- The **total number of roadway departure crashes** per year decreased at 43 of the 44 locations evaluated and by an overall average of **84%**.

### COMPARISON OF WET SURFACE ANNUAL CRASH RATES



**Durability:** HFST was installed at a test location in September 2013 and has since been exposed to several very harsh winter seasons. The findings show that the material is very durable and has withstood impacts from DelDOT plow trucks and applications of salt with little to no displacement of the aggregate and no removal of the resin binder material from the pavement surface.