

Cape Fear Memorial Bridge



By North Carolina Department of Transportation

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Benefits Statement

The Cape Fear Memorial Bridge (CFMB) Preservation Project enhances safety through increased law enforcement and quick incident clearance, vital for evacuations during hurricanes. It minimizes traffic disruptions by optimizing detour routes and completing the project ahead of schedule, restoring normal traffic flow sooner. Cost-effective repairs at \$7.1 million avoid a \$437 million replacement and reduce future maintenance expenses. The project supports the local economy by maintaining reliable access between New Hanover and Brunswick counties, crucial for commercial activities linked to the Port of Wilmington.

In this case study you will learn:

1. How North Carolina DOT's (NCDOT) traffic management strategies minimized disruptions and maintained reliable access during the CFMB Preservation Project.
2. How NCDOT used situational awareness and consistent communication to enhance decision-making and improve operational efficiency.
3. How NCDOT's collaboration with local agencies allowed the CFMB to return to full capacity a few weeks ahead of the anticipated completion timeline.

BACKGROUND

The Cape Fear Memorial Bridge (CFMB) is a steel vertical lift bridge opened in 1969 that is near the end of its lifespan. Due to the CFMB's age, the bridge requires frequent monitoring, inspections, and maintenance costing \$500,000/year to maintain. Rehabilitation costs have climbed more than \$10 million over the last decade. Local area officials have discussed multiple solutions for improvement, whether a new bridge, replacement, or an additional bridge. A final decision could take time and NCDOT needed an option to rehabilitate the bridge to extend its lifespan but within budget.

In January 2024, NCDOT began the six-month CFMB Preservation Project to repair the removable grid deck and beams. NCDOT estimated the cost of this project to be \$7.1 million as opposed to a cost upwards of \$437 million for complete replacement.

On average, the CFMB carries more than 70,000 vehicles daily between New Hanover and Brunswick counties. New Hanover County was the ninth fastest-growing place in the U.S. in 2023 with a 2.8% growth rate. Brunswick County experienced a population growth rate of 5.7% from 2021 to 2022 according to Census Bureau estimates, the highest in North Carolina.

Many vehicles crossing the CFMB are commercial motor vehicles transporting goods to and from the Port of Wilmington, which is a designated Foreign Trade Zone and an area readily accessible to 70% of the industrial base of the US. The CFMB is a popular corridor for summer travel and is a major evacuation route during hurricane evacuations.



Figure 1. CFMB & Preservation Project Site

TSMO PLANNING, STRATEGIES AND DEPLOYMENT

Community Concern: NCDOT announced plans to close the bridge in one direction throughout the project. Wilmington residents, business owners, and politicians expressed outrage over the anticipated closure, which was expected to have detrimental impacts to traffic and local commerce.

Timely project completion was imperative, as Wilmington is a summer vacation destination and sees a substantial increase in traffic volumes. More importantly, this area is prone to significant impacts from major storms during hurricane season with a likely potential of evacuations along this route. NCDOT offered a \$500,000 incentive to the contractor to successfully complete the project early.

To prepare for the closure, NCDOT focused as many Division resources as they could, and requested additional support from Statewide groups. The core focus was to keep traffic moving with minimal disruptions while providing capacity along alternate routes. Any disruption would cause significant queuing and substantially decreasing travel times through that corridor. NCDOT heard the concerns of the community and wanted every tool at their disposal to support their needs. So, NCDOT developed a comprehensive plan to incorporate responsive incident management strategies, optimized arterial operations, and a strong traveler information and communication campaign, which maximized the use of ITS technology.

Using SSP Resources: One incident management strategy that NCDOT incorporated was bringing in the state’s SSP, Incident Management Assistance Patrol (IMAP), to support traffic management and clearing incidents along the detour routes and roadways around the bridge. Regions across the state volunteered responders to support the project. The combination of IMAP working closely with local and state law enforcement agencies to initiate quick clearance practices provided the greatest impact. This practice allowed IMAP Responders

to remove vehicles from the roadway prior to the arrival of law enforcement and without further concurrence in property damage crashes only.

While the Department has moved IMAP personnel throughout the state to support hurricane and winter weather event responses in the past, this was the first large scale deployment of IMAP to support an active construction project.

Outreach to NC State Highway Patrol (NCSHP): To further increase incident management effectiveness, NCDOT worked with NCSHP to increase law enforcement presence by using off-duty Troopers to patrol the designated work zone limits. This allowed law enforcement who were close-by to immediately respond and investigate crashes and incidents, all in the spirit of quickly clearing incidents and keeping traffic moving. Additionally, Troopers were located upstream of the project to alert motorists to slow down to prevent back of the queue collisions.



Figure 2. NC State Highway Patrol

COMMUNICATIONS PLANNING AND EXECUTION

Collaboration Planning: To address issues with freight movement and using alternate routes suitable for trucks, NCDOT collaborated with the North Carolina Trucking Association. NCDOT was able to send over 13,000 geofenced notifications to carriers impacted by the construction reinforcing efficient movement of CMVs transporting goods to and from the Wilmington Port. NCDOT coordinated with truck navigation providers to deconflict the use of truck restricted routes to and from the port.

NCDOT worked with two towing companies in the area to be prepared to implement a Fully Operated Rental Equipment contract to have towing resources on standby should an incident occur within proximity to the project.

Use of Technology: NCDOT used existing ITS devices and software to share information with private partners and the traveling public. NCDOT provided travel time information to motorists on 15 dynamic messages signs (DMS) within the Wilmington area and monitored traffic 24/7 with cameras. Signal timing plans for detour and alternate routes were implemented, improving the flow of traffic in the area and alleviating congestion during an incident, especially along the alternate routes. NCDOT developed a project-specific webpage that included information about the project and schedule, camera snapshots, and travel times.

Execution: NCDOT initiated an ongoing Microsoft Teams meeting between local public agencies and the TMC for continued situational awareness of the roadways and bridge. The Teams meeting provided 24/7 access to cameras to NCDOT and over 117 first responders, which allowed responders and the TMC to use the chat feature to discuss activities in and around the bridge and detours.

Representation from the Division and TSMO unit held weekly coordination meetings to adjust

plans and resources based on traffic congestion and crash data and observations. The TSMO unit developed weekly travel time reports to show the performance of alternate routes indicating the magnitude of the impact. As NCDOT communicated the travel times with local leaders, the effects of the closure became less emotionally charged and more widely accepted as the consolidated operational strategies showed their benefits.

OUTCOME, BENEFITS AND LEARNINGS

Outcome: *Earlier project completion:* As a result of the collaboration efforts, NCDOT was able to return the CFMB to full capacity a few weeks ahead of the anticipated completion timeline. “I am proud to be part of the NCDOT and this community,” NCDOT Division Engineer Chad Kimes said. “The department has worked closely with its partners, which has proven to be key to getting critical messages out, and of course, finishing this project early.”

Benefit: *Maintaining travel time reliability:* Because of the additional resources and support added to the project area, the Travel Time Index (TTI) averaged to be 1.16 on the two major alternate routes moving over 70,000 vehicles daily. Maintaining travel time reliability was important for the Department to minimize the disruptions of the project for the traveling public.

Learning: *Situational Awareness and Communication were key to success:* Situational awareness and consistent communication were vital for enhancing decision-making and improving operational efficiency in this project. Weekly coordination meetings contributed to making real time adjustments to plans in the field and updates to the public. NCDOT received positive feedback in the numerous tools implemented in this project, such as, the use of technology, intentional resource management with IMAP personnel, collaboration with local first responders, and increased law enforcement presence.