



# GAINING CONSENSUS

by Jeff Folsom, Maine Department of Transportation

Close, regular communication turned contentious public debate to accolades for cast-in-place, rigid-frame replacement project

The top slab for the bridge was only 20 in. deep at midspan, creating nearly 13 ft of clearance (which beat the desired goal of 12.5 ft). This allowed 95% of all boats using the lake to pass through at any time unhindered. All Photos: Maine Department of Transportation.

The Naples Bay Bridge & Causeway project saved taxpayers millions of dollars, improved mobility on one of Maine's busiest east-west thoroughfares, enhanced pedestrian safety, and increased green space in a popular lakeside resort village. Those outcomes weren't assured, as a contentious public debate from a community loathe to losing its signature (but deteriorating) bridge posed significant obstacles. A carefully managed public-participation and community outreach process eventually turned these challenges into a highly successful project.

Nowhere is Maine's \$5-billion tourism industry revered more than in Naples, the heart of the Lakes Region that borders New Hampshire. Nestled between Brandy Pond and Long Lake,

the town serves as the village center for summer and year-round residents who enjoy its causeway and signature—but inconvenient—movable bridge. Built in 1954, the bridge was failing and caused significant traffic delays due to its frequent openings. But when the Maine Department of Transportation (MaineDOT) proposed replacing the swing-span bridge with a fixed bridge in 2006, the outcry was swift and nearly unanimous.

A "Save Our Bridge" group formed to fight the new bridge, even though it offered a cost-effective option and would improve navigational clearances for boaters. Those factors were less important to the community than retaining the signature look that added to the resort area's charm. Rather than charge ahead or back off completely,

MaineDOT created a working group with the town of Naples that included former Save Our Bridge members.

The community's concerns focused on the bridge's unique functionality and its aesthetic design. It was one of only two swing bridges left on the state's canal system. The movable bridge sat on a wide pier and used a massive counterweight to swing open, creating a distinctive operation. But the regular openings created a growing bottleneck for traffic. It also offered only 5 ft of clearance, requiring it to open for virtually every boat that needed passage.

What some in the community didn't realize was that, while the bridge attracted interest, it also caused others to steer clear of the town to avoid

## profile

### NAPLES BAY BRIDGE & CAUSEWAY / NAPLES, MAINE

**BRIDGE DESIGN ENGINEER:** Maine Department of Transportation, Augusta, Maine

**GENERAL CONTRACTOR:** Wyman and Simpson Inc., Richmond, Maine

**COMMUNITY PARTNER:** Town of Naples, Maine

becoming stuck in traffic. Defining that loss proved difficult, but the delays definitely were a detriment to the town.

## Clearance and Aesthetics Needed

The community leaders quickly understood that the swing structure could not be replicated and probably wouldn't be preferable even if it could, but they argued that if they were losing the unique design, they needed a bridge with lots of clearance to ensure easy passage and a signature style that could prove to be just as attractive. MaineDOT agreed those goals could be achieved.

## The give and take with the committee proved fruitful.

The give and take with the committee proved fruitful. For instance, at an early meeting, MaineDOT proposed constructing a temporary bridge so traffic could continue to flow while the new bridge was constructed. The committee suggested instead that the new bridge be constructed on a new alignment alongside the existing bridge, using the old one during construction. This proposal saved the \$2-million construction and demolition cost for the temporary bridge, allowing those funds to be shifted to other amenities. That agreement, as much as anything, made it clear that the partnership was focused on "our" bridge rather than making the discussion "us versus them."

The committee met weekly during the design process, providing input on everything from navigational clearance to lighting. As decisions were made, the group continued to meet regularly to decide structure selection, landscape design, and public outreach regarding traffic impacts.



The selected choice from three options presented featured a reinforced concrete rigid-frame structure with a variable-depth top slab and a gentle arch shape to the bottom of the slab.



The exterior-facing sides of the edge wall on the rigid frame featured a formliner with a natural-stone texture that added aesthetic value to the bridge's façade and created a timeless regionally sensitive appearance.

Critical meetings also were broadcast on cable-access television to involve all of the community. The town, as well as MaineDOT, maintained a project website throughout design and construction. In addition, the project manager and resident engineer developed a conscientious and respectful working relationship with the community.

## Three Options Considered

The designers presented three options to the committee for review. The final recommendation from the group was an 85-ft clear-span concrete arch that required minimal maintenance. This shape provided the aesthetic the town sought and could meet the goal of maximizing the vertical clearance for boaters.

## MAINE DEPARTMENT OF TRANSPORTATION, OWNER

**BRIDGE DESCRIPTION:** 85-ft-long, single-span, cast-in-place concrete rigid-frame bridge

**STRUCTURAL COMPONENTS:** Cast-in-place concrete rigid frame with 20-in. profile at midspan, 1200-ft-long, precast concrete-faced, sheet-pile seawall

**BRIDGE CONSTRUCTION COST:** \$9.2 million

**AWARDS:** 2014 Winner, Portland Cement Association's 14<sup>th</sup> Biennial Bridge Awards Competition



A sheet-pile seawall, required to shift the bridge's alignment, was created by driving piles at the toe of the bank and backfilling the area behind it. It was clad with a 6-in.-thick precast concrete facing featuring a pigmented, natural-stone texture similar to the one used on the bridge façade.

It soon became apparent that to provide adequate vertical clearance, the bridge would require a low-profile interior surface, which in turn would lead to high thrust forces at the spring line of the arch. With no bedrock present, the sandy soil would not be able to resist the thrust forces generated by the arch.

The structural design evolved to a reinforced concrete rigid-frame structure with a variable-depth top slab and a gentle arch shape to the bottom of the slab. Fortunately, the committee understood that form had

to follow function, while the designers maintained their goal of creating as slim and slender of a design as possible to meet the town's vision.

The top slab cast for the bridge was only 20 in. deep at midspan, creating nearly 13 ft of clearance (which beat the desired goal of 12.5 ft). This allowed 95% of all boats using the lake to pass through at any time unhindered. The exterior-facing sides of the edge wall on the rigid frame featured a natural-stone texture, cast using a formliner, that added aesthetic value to the bridge's façade and

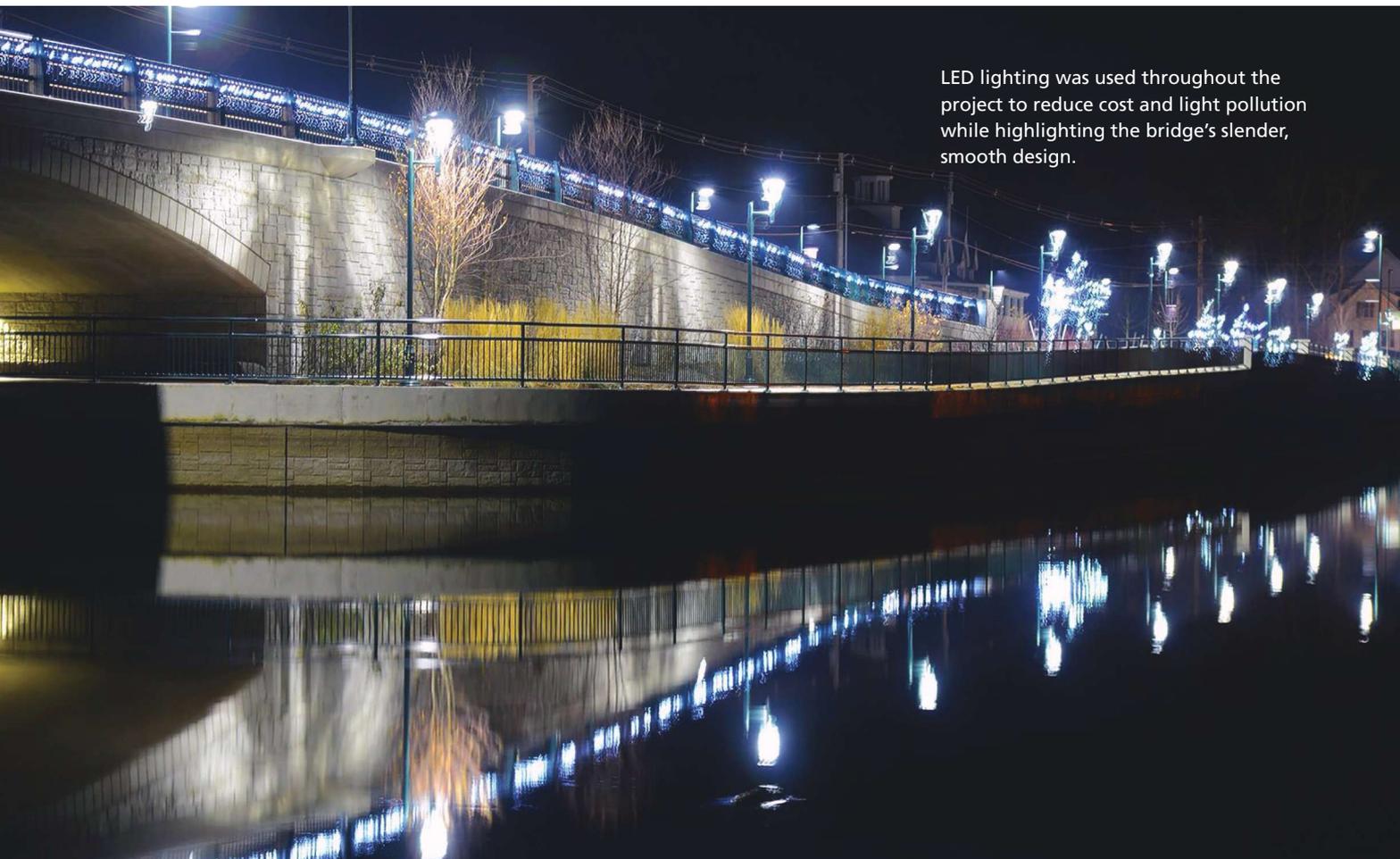
created a timeless, regionally sensitive appearance.

Foundations consisted of driven piles with tremie-seal foundations. The design considered varying values of soil stiffness and the resulting displacement and rotations of the rigid frame foundations to determine the maximum and minimum internal forces in the frame.

### **Decorative Seawall Built**

The project also encountered several permitting issues, due to its location in the heart of an environmentally sensitive area. To shift the location of the bridge to allow the existing bridge to remain in operation, it was necessary to rebuild the seawall at the edge of Long Lake. This was accomplished by driving sheet piles at the toe of the existing bank and backfilling the area behind it.

The community objected to the appearance of the proposed 1200-ft-long steel-pile bulkhead, but building a traditional cantilevered concrete retaining wall proved to be too challenging for the location. Instead, the sheet-pile bulkhead was



LED lighting was used throughout the project to reduce cost and light pollution while highlighting the bridge's slender, smooth design.



The new seawall allowed a former asphalt parking strip to be converted into a beautifully landscaped park-like area with a boardwalk textured sidewalk, as well as trees and a terraced seating section for special events and concerts.

clad with a 6-in.-thick precast concrete facing cast with a pigmented, natural-stone texture similar to the one used on the bridge façade. The cladding was attached from the wall's top to just below the streambed to create a continuous look with minimal excavation.

The bulkhead's low-profile design provided another aesthetic benefit, as it helped transform what was merely an asphalt parking strip into a beautifully landscaped park-like area with a boardwalk textured sidewalk varying in width from 12 to 15 ft. The new, open green spaces allowed lawn areas, tree planting, landscaped areas, lakefront seating areas, and a terraced seating section used by the community for special events and concerts.

The bulkhead provides a dramatic appearance from the water. The boardwalk's textured sidewalk offers access to businesses and both sides of the lake without pedestrians having to cross traffic. This design, on the site of a worn-down 1950s green-tinted asphalt parking lot, improved safety and mobility while boosting the local economy. LED lighting was used here and throughout the project to reduce cost and fixtures were chosen to reduce light pollution.

### Community Response

The response from the community has been tremendous. Citizens appreciated the collaborative approach and the level of

transparency provided throughout the project. Bob Neault, chairman of the Causeway Restoration Committee, told the local newspaper upon the project's completion that the project "was a real gem! It's a point of pride that we can look at this causeway and see the transformation, see the change in the hearts of our local residents that were opposed to the project to begin with but are now inviting people to see the beautiful spot that's been created."

The transformation has been "amazing," he added, calling it "a beautiful garden space that has already begun causing people to stop, get out, and take a look around... the increase to local business owners will be phenomenal." Indeed, local businesses began dressing up their façades and interiors to match the new look and the growing traffic to the area.

The project was singled out by the Portland Cement Association, winning an award in its 2014 design competition. "[It] nicely balances

aesthetics with cost," the jury said. "Every community that has to build a bridge of this scale should do so with this level of detail." It was also recognized in 2014 by the Northeastern Association of State Transportation Officials as part of America's Transportation Awards.

Government officials also have taken note. State Representative Rich Cebra said, "I know of no other instance where the state, local government, and interested members of the public have worked so well together...I will take this committee's example back to Augusta with me and brag about you, the people who rolled up their sleeves and worked together." **A**

*Jeff Folsom is assistant bridge program manager with the Maine Department of Transportation in Augusta.*

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