

PROCEEDINGS: CONTEXT SENSITIVE DESIGN SYMPOSIUM

CSD: Maintenance Issues

Fred Crozier, Maryland State Highway Administration

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Canal Parkway is an example of CSD features that present new issues for Maintenance crews after project completion:

MDSHA's first involvement with CSD was in completing the last 20 miles of I-68, in the late 80s and early 90s in partnership with local citizens groups and resource agencies, which incorporated aesthetic features not previously done. Maintenance later complained about some of these features as they proved difficult to maintain, e.g. use of new materials such as timber guard rails, building of features to look historic such as bridges, graffiti, rust stains bleeding from fencing onto concrete walls and barriers, peeling paint on signage, and landscaping. In hindsight MDSHA would opt for simpler design features as the ability to replace or repair certain items is either difficult due to cost or to non-availability of the product in the case of special order items.

To elaborate on an example: mowing is a big issue. A three-mile section of Canal Parkway equals 9-1/2 acres of mowing, MDSHA maintenance has tractor mowers. Some landscaping involves hand mowing which has led the MDSHA to contract out the mowing. In this particular instance, the contract cost is \$1770 per mowing x 25 times per year equals \$45,000. Also have contracts to maintain mulching, weeding, and the plants at \$25,000. This 3 mile area was a \$60,000 jolt to the county maintenance budget. MDSHA negotiated with Baltimore's central landscape group so that the local maintenance budget did not have to absorb the costs.

The prettier something is initially, the worse it looks when there's a problem. Often leads to contract work in order to solve the problems and prevent or delay recurrence. This means more money.

Neighborhood Conservation Programs:

Sharpsburg, MD, preservation of older trees -- Curbs were moved back and forth throughout the town in order to preserve trees. Street width often was determined by issues related to parking, traffic calming or saving trees. Drainage issues ultimately led to this neighborhood conservation program. Early in the 90s the MDSHA was ready to implement a cookie-cutter design when the Secretary of Transportation announced to the town that the project would be scratched and the MDSHA would build whatever the town wanted, and so CSD became an aspect of the project.

In another example, the planting of new trees was done in a town without many existing trees. One of the issues becomes who will maintain the trees once planted. Typically the MDSHA does much of the initial work and negotiates agreements with the towns or local governments to maintain them. Care and replacement clauses regarding landscaping items are typically part of these agreements. Contractor comes back for one year after completion of the project to replace any vegetation that has died.

Hancock, MD -- Designers worked with locals to create multi-use trails. Sidewalk replacement quickly became an issue due to flaking caused by snow-plows and salting. The town insisted that the MDSHA fix the problem even though they had signed off on the maintenance agreement. The MDSHA replaced 1/3 of the sidewalks in town. There was much finger pointing and money spent on testing of the concrete to determine fiscal

responsibility without significant resolution. What was discovered, which led the MDSHA to return to simpler concrete finishing on other projects, was the patterning in the concrete (preferred by the town) was both a labor intensive and highly specialized process which if improperly completed could have contributed to its failure.

Sharpsburg, MD -- Lessons learned in sidewalk maintenance. There were many different kinds of sidewalks in the town all of which needed maintenance: brick, concrete, resetting historic stone. The maintenance team opted to go door to door doing whatever was wanted by the residence to their bit of sidewalk. This proved to be an agonizing process, so now the MDSHA gets consensus from the town before any project is begun.

Brick crosswalks have proven problematic. In a town with low traffic volume, replacement of bricks can be accomplished with minimal disruption by blocking off part of the street. In higher volume areas and in applications where the brick is failing, the MDSHA is turning to using alternative methods such as stamped asphalt. Although there are known issues with the asphalt, such as the red color and imprints wearing away, stamped concrete is only an option if the cradle designed for the crosswalk is deep enough to accommodate the concrete. With such a replacement, the town may become disgruntled because of the disruption, particularly when repairs are being done to recently completed improvements.

Maintenance of Historic Structures:

In this bridge project lightweight concrete was used to fill the deck of a bridge to help keep the pressure from affecting the walls. Missing stones were replaced with stones from other parts of the bridge and the joints were re-pointed. The MDSHA pre-qualified the masons which is not typical but was necessary due to the importance of the structure. It also was necessary to get buy in from the community as the bridge had to be closed for this maintenance.

In a project involving an 1860s stone arch structure, bridge maintenance used form liners, in which corrugated pipe was placed underneath, holes were drilled in the deck, and grout was inserted in the void. This can be done in half sections at a time under traffic. Guardrails should not be anchored into an original stone wall, to solve this problem the MDSHA installs separate concrete blocks with footings that are built up against bridge.

MDSHA has started using timber guardrails on national roads, the question arises "why doesn't the MDSHA use them all the time"? Replacement of all galvanized guardrails is prohibitively costly (\$65-\$70 a foot compared to \$8 for galvanized), and aesthetically the mixing of old galvanized and new timber guardrails is not optimal. The MDSHA is searching for a solution.

Dealing with old unsafe structures can be challenging when they are historically significant and replacing them with a new structure is prohibited. In this example, the bridge was beyond repair, despite the best maintenance efforts of the MDSHA. The solution was to disassemble the bridge, build a concrete bridge underneath it that matched it exactly, and reface it with the original stone. It was a \$700,000 project, a new bridge was not priced, but typically being costly, the MDSHA may have come out ahead financially. In this particular instance the road had to be closed for several months, so community support was vital.

Annapolis, MD -- Bridge crossing the Severn River by the U.S. Naval Academy. The original swing-span bridge was built in 1886 and was replaced in 1924 by a draw bridge. The replacement of the draw bridge was maintenance driven. The surrounding community did not want to look at a high structure preferring to preserve the existing bridge. However, the cost of the draw bridge, including salaries for draw bridge tenders and the

maintenance costs proved prohibitive. To mitigate some of the concerns, MD sponsored a blind design competition. A panel was assembled drawn from: the county, the town of Annapolis, a civil engineering professor from Princeton, a professor from Zurich, a sculptor from NY, an architect from Chicago, the MD Historical Trust, DNR, Federal Highway Administration, and the Severn River Commission. The bridge, built in 1995, cost about \$33 million. Some of the more interesting elements of the project were included to benefit the community. Because members of the community enjoyed fishing from the bridge, the first three spans of the old bridge were preserved to serve as a fishing pier. In addition, the Governor requested that an overlook be built so that the old and new bridges and the river could be admired. So a parklette was constructed on the Naval Academy side. The area includes the bronze plates from the old bridge plus information about the design competition and the building of the new bridge.

The new bridge eliminated many of the maintenance costs. However, in the course of building it according to the wishes of the community and CSD, the new design has its own maintenance issues. What look to be plate and haunch girders are actually box beam construction which looks nice and serves the purpose. However, it changes inspection process (occurs every 2 years), what used to be accomplished by going out in a snooper truck, now requires a worker to go inside the box beams. Small ports provide access to the beam. In addition, a lighting and ventilation system (in accordance with OSHA) had to be installed inside the box beam, which also requires maintenance.

One of the challenges of growth and improvement is maintenance. Maintenance is usually the last to provide input for new projects, whether because of oversight or an attitude issue on the part of the maintenance department. It is up to maintenance teams to become involved and provide input on new designs. Each new solution brings a new learning curve for maintenance.