

The Case for a Memorial Bridge with Shared-Use Paths

A “green” paper comparison between the Memorial Bridge in Portsmouth, N.H. and the Hawthorne Bridge in Portland, Oregon

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Figure

The purpose of this paper is to evaluate two similar vertical lift bridges in the United States in order to better understand how rehabilitation of such structures to include shared-use paths for pedestrians and cyclists can meet modern-day, multi-modal transportation demands while preserving the overall historical integrity of the structure. The hope is that this comparison will help the people and governments of Maine and New Hampshire find a balance between potentially competing goals. While this paper clearly supports a bridge with separate shared-use paths for pedestrian and cyclist, the intent is not to curtail public process with regard to design, but suggest a

starting point. With regard to process it should be clearly understood that this paper is intended to be part of the public and internal [governmental] dialogue as the Connections Study scenarios, which include rehabilitation and replacement of the Memorial Bridge, are explored.

Whether the Memorial Bridge is rehabilitated or replaced with a new structure, the useful life expectancy ranges from 50-85 years. The significant resources required underscore the reality that we will likely not have such an opportunity to design a crossing that meets the demands of today and the future needs of tomorrow again in our lifetime. Not long ago the business of constructing transportation systems took little consideration of any form that was not motorized. Today we are witnessing a shift brought about by a variety of factors that include environmental impacts, energy cost and consumption, matters of health & wellbeing, and a desire to live a more connected life. Our communities have also changed so that what once may have been the central economic focus no longer is or has become just one component of a diverse economy. This differs greatly from the philosophy and priorities that existed when much of our transportation infrastructure, including the Memorial Bridge, was designed.

The Need for High Quality Pedestrian & Bicycle Facilities on the Memorial Bridge

Today, once considered a special use, walking and biking are becoming more and more a part of the way people live. This requires a transportation system and a Memorial Bridge that is responsive to this shift. The Memorial provides the only legal crossing of the Piscataqua River between New Hampshire and Maine for pedestrians and cyclists. Not simply a local route for pedestrian and cyclists, the bridge is a designated State Bicycle Route for both states. It also carries the East Coast Greenway (ECG) designated as the New Hampshire Seacoast Greenway in New Hampshire and the Eastern Trail in Southern Maine. Developed as a multi-use, "urban Appalachian Trail", the ECG runs

nearly 3,000 miles connecting cities, towns and natural areas along the eastern seaboard from Calais, Maine to Key West, Florida (www.greenway.org). While envisioned as an off-road trail network, the ECG depends on local roads and bridges in places where an off-road connection is not possible such as the Piscataqua River. The local and national significance of the ECG can be best understood by considering that Route 1 is to vehicles what the ECG is to cyclists and pedestrians. In summary, without the Memorial Bridge or a similar replacement structure, the connection between the non-motorized Maine and New Hampshire routes will be severed and the ECG will no longer be a single contiguous route.

Design Limitations on the Memorial Bridge & Approach Roads

As a shared use (multi-modal) facility the current design of the Memorial Bridge creates several endangering conditions for all users with a disproportionately high risk for cyclists. The following structural conditions currently pose the most significant risk:

§ **Open-grate decking** on the lift span roadway catches bicycle tires under optimum conditions, but becomes treacherous under wet conditions causing tires to slip and riders to lose control. When a cyclist falls, just the impact on the grate can cause serious injuries, without consideration of additional injuries caused by vehicles on the bridge at the time of the fall.

§ **Narrow auto travel lanes** allow very little room for error between automobiles and bicycles. A cyclist that is riding appropriately in the narrow shoulders (approximately 3-ft from outside of line to curbing) must remain alert for vehicles, appurtenances or items in tow that enter the shoulder because of size, driver error or in order to avoid another vehicle in the opposite lane. This situation significantly decreases the likelihood that a cyclist will be able to find a safe area if he/she experiences trouble while riding.

§ **Drainage grates** spaced at regular intervals leading up to the lift span create an additional hazard for cyclists already trying to navigate the narrow shoulders. The grates are designed with wide spaces and sit approximate 2-inches below the road surface creating an opportunity to catch a wheel or destabilize a rider.

§ **Narrow sidewalks** on each side of the bridge do not allow pedestrians and cyclists to safely co-exist. The approach sidewalks currently provide an approximate 9-ft travel way; however this decreases on the truss spans where structural beams reduce the sidewalk to approximately 5½-ft. This is complicated further by the presence of several bridge operator stations which in addition to creating blind spots, reduce the sidewalk around them to 4-ft. The net effect is like a funnel which forces users traveling in different directions, at varying speeds, with equipment in tow (bicycle, stroller, etc.) to share increasingly smaller space. This creates an endangering situation for bridge operators, pedestrians and cyclists alike. For comparison, the American Association of State Highway Transportation Officials (AASHTO) recommends a width off 10 feet for a multi-use path that will receive significant traffic.

§ **Sidewalk surfaces** currently used on the Memorial Bridge and Scott Avenue Overpass include pavement, wood and an aluminum grating. This creates inconsistencies and safety concerns for users that could be avoided by the use of a single type of surface. It is worth noting how many users avoid walking on the aluminum sidewalk grates by walking on the curbing or in the roadway because they and/or their pets are frightened. Metal grating and wet wood decking can also be difficult to safely navigate for dismounted cyclists wearing standard cycling shoes, which have protruding cleats and little tread for grip. The grate creates an un-necessary risk easily corrected by a solid deck material.

§ **Sidewalk railing height** does not currently meet AASHTO's 42" height requirements for use by cyclists. Increasing the railing height would be necessary in addition to adding width to the flanking walkways to make them safe for mounted cyclists

§ **Road crossing conflicts** occur for pedestrian and cyclists as they transition between bridge and connecting roads on both the Kittery and Portsmouth sides. Conflicts are more significant on the Portsmouth side because of additional road connections and confusing traffic patterns. This illustrates the need to redesign traffic patterns and traffic control devices that consider pedestrian and cyclist travel patterns rather than just motor vehicles.

User Issues on the Memorial Bridge and Approach Roads

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§ **Maine & New Hampshire Laws** generally grant the same rights and duties to cyclists that drivers of motorized vehicles have. Both states require a 3-foot minimum clearance when passing a bicycle and allow drivers to cross a double yellow line to allow the 3-foot clearance in passing a cyclist if it is safe to do so. The Memorial Bridge is especially challenging because the narrow roadway, coupled with high traffic volumes during peak periods, reduces the ability of a driver to pass a bicycle in accordance with these laws. Further the cyclist does not have the option to leave the roadway in order to avoid a more severe collision with a motor vehicle that did not follow the above rules because of the structural barrier created by the railings and trusses.

§ **Diverse non-motorized uses on sidewalks** must try to safely co-exist. Many of these non-motorized uses introduce additional factors such as strollers, pets or bicycles which require more space in all directions between users. Users also travel at different speeds, creating a desire to pass slower users. This creates a potential conflict amongst users who refuse to yield the way or maintain little consideration for the safety of their fellow users. This situation has resulted in concerns over potential injury and a history of

arguments between users. Also of note is the use of the sidewalk by more passive users who stop for long periods of time for various reasons including sightseeing.

§ **Cyclists must walk:** In response to current sidewalk conditions, a policy was implemented that requires cyclists to walk their bicycles if they chose to use the sidewalks. While this is understandable under the current conditions and laws governing sidewalk use, it has the net effect of unfairly causing the cyclist to be less effective in his chosen method of transportation. It also does not solve the design problem that sidewalks are too narrow to meet today's moderate to heavy use.

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The Benefits of Shared-Use Paths on the Memorial Bridge

§ The creation of well connected, first-class bicycle/pedestrian facilities correlates with increased walking and bicycling. Increased walking and bicycling have been identified as effective strategies to improve health, reduce carbon emissions and fuel dependency while fostering a general sense of community wellbeing.

§ Adding 10-ft shared use paths on each side of the Memorial Bridge effectively doubles the current sidewalk capacity while translating to a modest, approximate 12-ft (6-ft per side) addition to the bridge's total width.

§ The improvements suggested above will provide a first-class, multi-modal Memorial Bridge and related connections that will allow diverse uses to safely co-exist and reduce conflicts amongst responsible users.

§ The East Coast Greenway, known locally as the N.H. Seacoast Greenway and Eastern Trail, connection between Maine and New Hampshire will be preserved and overall capacity increased.

Conclusion

There is a growing demand for better walking and bicycling facilities throughout the United States and the region served by the Memorial Bridge is no different. Called by some a “build it and they will come” approach in the early days of developing pedestrian and bicycling facilities, cities such as Portland Oregon could be considered pioneers. Initiatives such as the New Hampshire Seacoast Greenway and the Eastern Trail are already linking our local communities while the overlay of the East Coast Greenway forms a connection between states from Maine to Florida. Data collected as part of the Maine-N.H. Connections Study illustrates that walking and cycling on the unimproved Memorial is significant. Clearly, a strategic investment in the development of the Memorial’s walking and bicycling facilities will only increase usage.

A paradigm shift has occurred that requires alternative forms of transportation that foster a healthier environment, community and individual. Multi-use trails are an integral part of a balanced transportation system, provide recreational opportunities for all ages, help promote healthier lifestyles, and support local economic development. It has taken 60+ years to construct our current transportation network designed largely for automobile travel at the expense of non-motorized travel. Fixing this problem and transforming our transportation infrastructure so that it can meet this change will not happen overnight. However, one way to work through this challenge is to view every project, like the Memorial Bridge rehabilitation or a road repair, as an opportunity to include improvements for walking and bicycling. It is often more cost effective to include these

improvements while a construction force is already mobilized than to approach it as a stand-alone project. That is why it is critical that we consider fully the ways in which the Memorial Bridge can become a first class walking and bicycling facility. This is especially true when considering the proposed addition of 10-ft shared use paths because the added weight will have to be factored in to improvements made to the structure and lift mechanism. While the proposed paths will add cost to the rehabilitation consider how costly or likely prohibitive it will be to determine after-the-fact that measures should have been taken to expand the current capacity.

The purpose of comparing the Hawthorne and Memorial Bridges was to demonstrate how one community was able to preserve a historic structure while adapting it to meet changing needs. The comparison is even more helpful because it is between two bridges that are truly sisters. While the Portland Community is larger than that served by the Memorial Bridge, and the Hawthorne is a larger bridge than the Memorial (four lanes of motorized traffic) the benefit of the comparison remains. It clearly shows that capacity can be improved and the impact to the overall historical integrity of the bridge minimized.

Proposed solutions to the challenges facing pedestrians and cyclists on the Memorial Bridge to date have focused primarily on policy, laws and enforcement. The real challenge is not the laws that protect cyclists and other roadway users, but users (drivers and cyclists) who do not follow the laws; thus compounding dangerous conditions caused by the current design of the bridge. Law enforcement is one method to reduce this problem; however, it is a reactive approach that occurs after a law has been broken or an accident has occurred. Instead, there is a proactive opportunity to eliminate much of the problem by designing a bridge that meets demand and is better suited for diverse types of usage.

The worsening conditions on the Memorial Bridge, and concern for its future, have effectively shifted public focus from enforcement and band-aid solutions to one of comprehensive repairs or replacement and design improvements. The first round of discussion that resulted in the rejected 2008 plan for rehabilitation started with limited consideration for walking and cycling on the Memorial Bridge – it focused mainly on replacing the steel grid deck with a solid surface. As concern grew, several advocates including the author formed a group in 2006 called Bridge to the Greenway. Together with members of Seacoast Area Bike Routes, the Eastern Trail Management District and the East Coast Greenway Alliance; we spoke of the need to include comprehensive improvements that will make a real difference for walking and cycling on the bridge. At that time information about the Hawthorne Bridge in Portland was provided to both New Hampshire and Maine Departments of Transportation with the request that they examine closely the addition of shared-use paths on the Memorial Bridge. Based on the 2008 rehabilitation plans, it appears that structural and mechanical improvements will primarily benefit motorized and aquatic traffic. Missing are improvements that maximize the potential to make the Memorial Bridge a first class walking and biking facility. Creating a solid deck on the lift span and relocating operator stations does improve the bridge for pedestrians and cyclists; however, several concerns listed above remain if improvements stop there. For example, a solid deck on the road portion of the lift span would be an adequate improvement for an experienced cyclist; however the narrow roadway still presents a challenge for less experienced users such as children.

The ME-NH Connections Study has engaged a positive public process that this author feels is often lacking from projects undertaken by departments of transportation. While at times painful, it has brought people with different priorities together to really think about mobility over, on and around the Piscataqua River. Many have learned that by working together despite our differences we can reach a greater level of understanding and produce a

better product. Much of the conversation to date has focused on number, type and location of crossings. A next step needs to be in-depth discussion of specific improvements that could be made to an existing structure or design aspects that could be included on a new structure. The recent news that New Hampshire and Maine's application for TIGER stimulus grant funding was unsuccessful actually has a silver lining in this regard. Had the TIGER proposal been successful, the two states would likely have been locked into a rehabilitation scope from the original 2008 project. We have come too far in our public dialogue to miss the opportunity to design the rehabilitation of the Memorial Bridge, or the design of a replacement bridge, to truly address the safe accommodation of all users of the Bridge. These are our communities and our bridges, so we must require a process that reflects that, and find workable solutions that will allow for the incorporation of the walking and cycling improvements contained herein. Remember, we will likely not have such an opportunity to design a crossing that meets the demands of today and future needs of tomorrow again in our lifetime.

Resources

The following articles and websites were helpful in the development of the background for this paper:

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Memorial Bridge (Portsmouth, New Hampshire). Wikipedia. Retrieved January 12, 2010 [http://en.wikipedia.org/w/index.php?title=Memorial_Bridge_\(Portsmouth,_New_Hampshire\)&oldid=338215605](http://en.wikipedia.org/w/index.php?title=Memorial_Bridge_(Portsmouth,_New_Hampshire)&oldid=338215605)

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