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October 12, 2018

Guy Smith
Executive Director
Milwaukee County Department of Parks, Recreation & Culture
9480 Watertown Plank Road
Wauwatosa, WI 53226

Subject: Rehabilitation of Lake Park Ravine Road Footbridge

Dear Guy,

We are pleased to share with you the attached supplemental structural engineering evaluations (the "Evaluation") of the Lake Park Ravine Road footbridge (Bridge). Lake Park Friends (LPF) commissioned the Evaluation to provide the County a more thorough analysis of the Bridge's condition than previous studies conducted and to better evaluate the rehabilitation option for the Bridge. The Evaluation provides the data necessary to show that if the County rehabilitates the Bridge, the Bridge will be safe, economically feasible in terms of cost and longevity, and, importantly, compliant with local, state, and federal historic preservation laws.

The Evaluation demonstrates, among other things, that the Bridge can feasibly be rehabilitated and the service life extended for at least another 50 years. This finding, based on a more complete picture of the structural condition of the Bridge, significantly alters the cost benefit comparisons previously conducted by the County, in favor of rehabilitation, especially when historic preservation laws are properly considered. These laws require that the County first and foremost consider repair of an historic structure such as the Bridge. It is based on these facts that LPF requests that the Milwaukee County Parks Department rehabilitate the existing historic Lake Park Ravine Road footbridge.

Background

Last year, at its own cost, LPF hired TranSystems, an engineering firm with extensive experience in the preservation and rehabilitation of historic concrete bridges throughout the country, to independently review the existing Bridge structural documentation and to determine if there was a viable cost-effective rehabilitation alternative that preserves the original Bridge design and extends its service life beyond the 15-25 years reported in the County's 2015 In-Depth Inspection Report (GRAEF, 2015). LPF selected TranSystems as one of the most qualified after reviewing a number of firms with the relevant experience and expertise that this historic concrete bridge requires.

The following is a short summary of TranSystems' findings (the full reports are attached):

a. **The Bridge's concrete and steel reinforcement are in suitable condition for rehabilitation**. TranSystems identified that concrete material tests, typically conducted when evaluating historic concrete structures, had not been performed on the Bridge (TranSystems, 2017 [Attachment A]). In determining if historic concrete is suitable for rehabilitation, certain laboratory tests are routinely run on concrete samples. The County's 2015 In-Depth Inspection Report tested the bridge concrete only for strength and asbestos – important data for bridge demolition – but the 2015 inspection did not include chloride ion, petrographic, or freeze-thaw analyses which are industry standard

tests for concrete bridge rehabilitation projects. It should also be noted that the National Park Service identifies these tests as part of their condition assessment procedures for preserving our nation's historic concrete structures (Godette and Slaton, 2007).

Because of this, with the County's approval and oversight, LPF collected additional concrete samples and conducted these tests. TranSystems reviewed the test results and concluded that overall, they are well within acceptable ranges of similar concrete found on other historic concrete structures that have been successfully rehabilitated across the country (TranSystems, 2018a [Attachment B]).

b. **The Bridge meets current pedestrian bridge safety standards for load carrying capacity**. TranSystems reassessed the Bridge's capacity using a load rating methodology that is the standard for older concrete bridges. The County's 2015 In-Depth Inspection Report used a load rating methodology that, while standard for newer bridges, is inconsistent with state and national requirements for rating older bridges partly because it is known to underestimate an older bridge's capacity. TranSystems' analysis also noted the 2015 load rating calculations used assumptions about the bridge's actual construction and its reinforcement system that resulted in additional capacity underrating. While underestimating a bridge's capacity may seem like a conservative approach, in practice, it could result in unnecessary expenditures repairing or replacing structurally sound bridges across the country.

   Using the appropriate rating methodology and available information about the bridge's construction and unique reinforcement system, TranSystems found that the Bridge's capacity meets today's standards for pedestrian loading (TranSystems, 2018b [Attachment C]). It should be noted that GRAEF disagreed with some of TranSystems' analysis assumptions (GRAEF, 2018 [Attachment D]), therefore, LPF, the County, TranSystems, and GRAEF held a conference call to discuss these results. The differences in professional opinion identified would result in only minor changes to the load ratings conducted by TranSystems that could easily be addressed during a rehabilitation (Reilly, 2018; TranSystems 2018c [Attachments E and F, respectively]).

c. **A rehabilitated Bridge can last for at least another 50 years**. TranSystems evaluations conclude that, based on the additional concrete testing results (discussed in [a] above) and based on a more applicable load rating calculation (discussed in [b] above), a rehabilitated bridge should last at least another 50 years (and likely many years beyond that). LPF, the County, TranSystems, and GRAEF agree that to realize this service life extension, the rehabilitation would have to be properly designed and constructed, with quality control oversight during construction and regular maintenance (as would a new bridge) (Reilly, 2018 [Attachment E]).

Historic Preservation Requirements

The Bridge is a contributing structure within the National Register of Historic Places-listed Lake Park National Historic District and is a City of Milwaukee Landmark within the North Point North Historic District. In accordance with Milwaukee County's "*Regulatory Compliance and Next Steps*" report (Mead & Hunt, 2017), the Bridge is subject to local, state, and federal historic preservation regulations, which require that any proposed action that would affect a historic property must identify measures to "avoid,

minimize, or mitigate the adverse effect to the historic property" (removal of a contributing structure would constitute an adverse effect). Federal funding and any local permits may actually be denied to reduce negative impacts to a historic property, In June 2016, the State Historic Preservation Officer (SHPO) concluded that Milwaukee County must demonstrate that "the bridge may not be feasibly repaired or rehabilitated" (SHPO, 2016).

This new information gives us a more complete picture of the Bridge's structural condition and shows that the Bridge can be feasibly rehabilitated. It should be noted also that while the newly awarded Transportation Alternatives Program grant provides funding to replace the bridge, the Wisconsin Department of Transportation has stated that this funding can also be used to rehabilitate the bridge (Robert Schmidt, personal communication, September 10, 2018).

During its July 2018 meeting, LPF's Board of Directors unanimously passed a resolution recommending the bridge be rehabilitated rather than replaced. LPF now requests that the County eliminate replacement of the Bridge from further consideration and proceed pursuing qualified historic bridge rehabilitation design firms. Given our significant involvement and the information we have learned through the Evaulation, we also believe that LPF would be a valuable partner to the County in this next step, and we request participation in the County's development of the RFP and design engineer selection process.

Please feel free to contact me at ckreilly@outlook.com or via phone at 414.202.5730 if you have any questions.

Sincerely,

Colleen Reilly

Colleen Reilly, PMP
President
Lake Park Friends

Cc:
Chris Abele, Milwaukee County
Sheldon Wasserman, Milwaukee County Board of Supervisors
Karl Stave, Milwaukee County
Sarah Toomsen, Milwaukee County

References:

GRAEF, prepared for Milwaukee County Department of Architecture and Engineering. 2015. Historic Lake Park Arch Bridge Over Ravine Road In-Depth Inspection Report. July.

GRAEF. 2018. Memorandum RE: Lake Park Arch Bridge Load Calculation Review. September.

Godette, Paul and Deborah Slaton, prepared for the National Park Service, U.S. Department of the

Interior. 2007. Chapter 15 Preservation Briefs, Preservation of Historic Concrete. ISBN: 978-0-16-078946-5.

Mead & Hunt, prepared for Milwaukee County. 2017. Regulatory Compliance and Next Steps, Lake Park Bridge over Ravine Drive. June.

Reilly, Colleen. 2018. Meeting Minutes, Subject: Lake Park Ravine Road Concrete Footbridge. September.

TranSystems. 2017. Letter report RE: Structural Documentation Review of Lake Park Arch Bridge – Part 1. October.

TranSystems 2018a. Letter report RE: Lake Park Arch Bridge over Ravine Road- Phase 2: Concrete Testing Results. June.

TranSystems. 2018b. Letter report RE: Lake Park Arch Bridge over Ravine Road – Phase 3: Structural Analysis Results. August.

TranSystems. 2018c. Email correspondence to C. Reilly. Lake Park Arch Bridge Report Review. October 4.

Attachments:

A. TranSystems' 2017 Part 1 Report.
B. TranSystems' 2018 Phase 2 Report.
C. TranSystems' 2018 Phase 3 Report.
D. GRAEF's 2018 Review comments on TranSystems Phases 2 and 3 reports.
E. 2018 Meeting minutes of conference call between Milwaukee County, GRAEF, TranSystems, and Lake Park Friends.
F. TranSystems' 2018 email to C. Reilly regarding the Khan reinforcement system clarification.