


RYE PUBLIC WORKS
10 Central Road
Rye, New Hampshire 03870
Telephone (603) 964-5300
Fax (603) 964-1516
jrucker@town.rye.nh.us

Date: November 21, 2022
To: Matt Scruton, Town Administrator
From: Jason M. Rucker, Public Works Director 
Subject: Harbor Road Bridge Update 7

This memo is intended to provide an update on the timeline of events and actions taken, future repair strategies, and request for new contracted service from Hoyle Tanner.

In July of 2022 the Town of Rye discovered deterioration of Beam #4, the southern exterior girder, consisting of spalled concrete on the lower portion of the stem with exposed, severely corroded, separated lower prestressing strand within the spalled area. Upon review Hoyle Tanner revisited the load rating calculations previously prepared as part of the 2016 evaluation project for Harbor Road Bridge and recommended that the Town take immediate action to restrict vehicular traffic from utilizing the portion of the bridge deck carried by Beam #4. That recommendation was immediately implemented by the Town and remains in place.

Hoyle Tanner then performed an emergency inspection of the Harbor Road Bridge on August 17, 2022. During this inspection, a large spall at midspan of the southern exterior girder (Beam 4) was observed with 100% section loss of the bottom exposed prestressing strand. Another prestressing strand, located immediately above the lower strand in this area, was also partially exposed with heavy corrosion.

Based on these inspection findings, both Hoyle Tanner and the Town agreed that some short-term action needed to be taken if traffic were to remain using the bridge. Two big picture options were available: either immediately implement an emergency repair/rehabilitation project to address the observed deficiencies or re-examine and refine the 2017 load rating calculations using more accurate information regarding the number and location of prestressing strands. The Town concurred that updating the 2017 load rating results utilizing data from a more intensive non-destructive evaluation information would be provide valuable information to assist with the decision to either proceed in the immediate term with an emergency superstructure replacement project, or to postpone such a project until the 2023 construction season.

Hoyle Tanner recommended that the services of a specialty subconsultant providing ground penetrating radar (GPR) services, such as NDT Corporation (NDT), be utilized. NDT was contacted to perform a GPR scan of each beam stem, and that work was completed on October 3, 2022, confirming the presence of a third prestressing strand in each of the 8 beam stems.

The 2017 load rating calculations were then re-run by Hoyle Tanner for Beams 1-3 utilizing the strand locations determined via NDT's GPR scanning. Updated load rating calculations that consider the 3rd prestressing strand, the refined strand locations, and the 0.85 condition factor indicate that the maximum vehicle weights resulting from the 2017 load rating calculations can be maintained. Though the condition of the beams has deteriorated since 2017 warranting use of the 0.85 condition factor (i.e. a 15% reduction in strength), the presence of a third prestressing strand that was previously unaccounted for results in similar load rating results.

A repair, rehabilitation, or replacement project is necessary and should be completed as soon as possible; however, inspection and structure evaluation tasks prepared as part of this project indicate that Beams 1-3 of the bridge can remain serviceable through the upcoming winter months and into the 2023 construction season while still carrying the maximum vehicle weights recommended by Hoyle Tanner in 2017.

The anticipated scope of a superstructure replacement project will include a multi-day closure of the bridge to remove the existing superstructure, preparation of the bearing seats as necessary, replacement of the superstructure with a precast concrete slab superstructure, installation of a waterproofing membrane, and paving of the bridge deck and roadway approaches. Based on cursory field observations and review of the original construction drawings, reuse of the substructure (i.e., concrete filled, steel sheet piling abutments) as part of a superstructure replacement project is feasible. However, additional investigation will need to be completed to determine if any substructure strengthening or repairs are also required, and how that work can be completed (if necessary) either before, during, or after the superstructure replacement project is constructed.

It is my recommendation that the Town seek to engage Hoyle Tanner and Associates in a new contract to oversee a conventional design-bid-build process which would be completed during the upcoming 2023 construction season.

Funding for the project is ultimately the Select Boards decision, although I recommend we use funds from the Additional Highway Block Grant (\$115,401.08) and the Municipal Bridge Block Grant (\$78,255) that was awarded to the Town. The remainder of the funding can be found in the Unassigned Fund Balance to avoid bonding or warrant articles.

cc: Becky Bergeron