



M E M O R A N D U M

DATE: July 17, 2026

TO: Tennessee Department of Transportation

FROM: American Structurepoint, Inc.

RE: TDOT Timber Bridge Bundle #2 – Bridge 16 (PIN: 134846.00) Hydraulic Summary

CC: Steve Sellers – Tennessee Department of Transportation
Derek Link – Tennessee Department of Transportation
David Flanders – HNTB
File

This memo presents the preliminary hydraulic modeling analysis findings for TDOT Timber Bridge Bundle #2 Contract DB2601, Bridge 16 (SR 193 over Alexander Creek, PIN: 134846.00). The goal of the analysis was to determine the approximate hydraulic impacts of performing a bridge replacement. All geometric structure data utilized in the modeling originated from the Bridge Concept Report unless noted otherwise.

Modeling Methodology: The hydraulic modeling is in accordance with the 2012 Design Procedures for Hydraulic Structures, consisting of Tennessee Hydraulics Memorandum (THM)-01 through THM-10. Modeling software used was HEC-RAS v6.6. Discharges were obtained from StreamStats mean discharge data. Field survey within the limits of the existing structure was included in the scope of services at the time the hydraulic analysis was performed. Site topography was based on field survey provided by HMB on 2/13/2026, where available, and Tennessee USDA 2015 LiDAR. Low girder elevations were recorded from field survey data. The riprap dam beneath the structure will be removed as part of the bridge construction.

Existing Conditions: The existing structure was modeled as a three span bridge with spans of 19 ft, 19 ft, and 19 ft, for an overall structure length of 57 ft and a clear span of 52.00 ft between front faces of the piles at the abutments. The structure was modeled with an out-to-out width of 22.33 ft based on field survey. The piers consist of 12"x14" timber caps on 12" diameter timber piles, and the low girder elevation is 351.82 ft.

Proposed Conditions: The proposed structure was modeled as a single span bridge with a structure depth of 3.55 ft. The structure was modeled with a an overall length of 60 ft, with 3 ft wide abutments and a 54 ft clear span between faces of abutments. The existing structure provides sufficient freeboard above the 50-year storm, therefore the roadway profile was maintained and the low structure elevation lowered approximately 1.75 ft to accommodate the deeper structure depth. This is a deviation from the Bridge Concept Report's recommended 1 ft roadway profile increase. The out-to-out bridge width was modeled as 31.25 ft.

Hydraulic Summary: The proposed structure results in a backwater of 0.29 ft, which does not exceed TDOT's recommended 1 ft maximum per THM-03, however velocities within the bridge opening are expected to increase. The structure provides 1.30 ft of freeboard above the proposed 50-year water surface elevation. The structure is not anticipated to cause an adverse effect compared to existing condition. The proposed structure configuration does not consider soil instability within the vicinity of the structure. A detailed scour analysis should be performed during final design in accordance with THM-08.



	Existing	Proposed
Drainage Area	4.2 mi ²	
Design Discharge (50 Year)	2,220 cfs	
50 Year Water Surface Elevation ¹	348.49 ft	
Water Area Provided Below El. 348.49	360.15 ft ²	309.90 ft ²
50 Year Average Velocity	6.16 fps	7.33 fps
50 Year Headwater Elevation ²	350.80 ft	348.78 ft
50 Year Bridge Backwater Above El. 348.49	2.31 ft @ El. 350.80	0.29 ft @ El. 348.78
100 Year Discharge	3,040 cfs @ El. 348.53	
Roadway Overtopping Elevation	351.80	351.80
Low Girder Elevation	351.82 ft	350.08 ft ³
Freeboard Provided Above 50 Year Headwater ⁴	1.02 ft	1.30 ft

Note: Elevations provided are in feet in the NAVD88 vertical datum

¹Elevation taken at 1st cross section upstream of bridge

²Elevation taken at 1st cross section upstream of bridge

³Elevation taken at Abutment 2

⁴Freeboard = 50 Year Headwater Elevation – Low Girder Elevation.