



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 35 (PIN: 134880.00) & 36 (PIN: 134881.00) Hydraulic Summary

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

This memo presents the preliminary hydraulic modeling analysis findings for TDOT Timber Bridge Bundle #2 Contract DB2601, Bridge 35 (SR 179 over Overflow, PIN: 134880.00) & Bridge 36 (SR 179 over Little Muddy Creek, PIN: 134881.00). 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 Reports, existing plans and survey 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 6.6. Discharges were obtained from StreamStats mean discharge data. Field survey 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 March 5th 2026, where available, and Tennessee USDA 2015 LiDAR. Bottom of beam elevations were approximated based on roadway LiDAR elevations and approximate structure depths. Inaccurate LiDAR flowline elevations were corrected based on the average difference when comparing to the available.

Existing Conditions:

Both structures were modeled together as part of a multi-opening crossing over Little Muddy Creek. In addition to the two bridge openings, a conveyance opening was included in the crossing to model existing roadway overtopping to the west of the overflow structure.

SR 179 over Overflow

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 54.75 ft between front faces of the piles at the abutments. The structure was modeled with an out-to-out width of 26 ft. The piers consist of 12 in x14 in timber caps on 13.5 in diameter timber piles with 3 ft diameter concrete encasements on the lower portions of the pier, and the structure depth is 1.58 ft, measured from profile grade to the bottom of beam, with a 2 in existing HMA overlay.

SR 179 over Little Muddy Creek

The existing structure was modeled as a four-span bridge with spans of 19 ft, 19 ft, 19 ft, and 19 ft, for an overall structure length of 76 ft and a clear span of 73.75 ft between front faces of the piles at the abutments. The structure was modeled with an out-to-out width of 26 ft. The piers consist of 12 in x 14 in timber caps on 13.5 in diameter timber piles with 3 ft diameter concrete encasements on the lower portions of Piers 2 and 4, and the structure depth is 1.58 ft, measured from profile grade to the bottom of beam, with a 2 in existing HMA overlay.

Proposed Conditions: Both proposed structures were modeled as three span bridges with a superstructure depth of 41.75 in. The structures were modeled with overall lengths of 105 ft, with 3 ft wide abutments and 99 ft clear spans between faces of abutments. The proposed roadway profile at the structures for the Overflow crossing increased 3.12 ft and for the Little Muddy Creek crossing increased 2.77 ft compared to existing condition. The out-to-out bridge width was modeled as 31.25 ft.



Hydraulic Summary: The proposed structures result in a backwater of 0.98 ft which meets TDOT's recommended 1 ft maximum per THM-03 and is an improvement over existing conditions. The structures are not anticipated to cause an adverse effect to water surface elevations.

HYDRAULIC SUMMARY - SR 179 OVER MUDDY CREEK		
	Existing	Proposed
Drainage Area	2.4 sq. mi.	
Design Discharge (50-yr)	2294.3 cfs	2484.09 cfs
50 Year Water Surface Elevation	288.64	
Water Area Provided Below El. 288.64	356.7 sft	532.2 sft
50 Year Average Velocity	6.5 fps	4.67 fps
50 Year Headwater Elevation ¹	290.63	289.62
50 Year Bridge Backwater	1.99 ft @ El. 290.63	0.98 ft @ El. 289.62
500 Year Discharge	2651.47 cfs @ El. 291.4	3365.56 cfs @ El. 290.03
Roadway Overtopping El.	291.30	293.37
Low Girder Elevation	289.34	290.59
Freeboard Provided Above 50 Year Headwater ²	-1.29 ft	0.97 ft
Span Arrangement	4 @ 19 ft	3 @ 35 ft
Finish Grade El.	291.34	294.07
HYDRAULIC SUMMARY - SR 179 OVER OVERFLOW		
	Existing	Proposed
Drainage Area	2.4 sq. mi.	
Design Discharge (50-yr)	1799.44 cfs	1845.92 cfs
50 Year Water Surface Elevation	288.64	
Water Area Provided Below El. 288.64	267.1 sft	490.5 sft
50 Year Average Velocity	6.87 fps	3.76 fps
50 Year Headwater Elevation ¹	290.63	289.62
50 Year Bridge Backwater	1.99 ft @ El. 290.63	0.98 ft @ El. 289.62
500 Year Discharge	1967.29 cfs @ El. 291.49	2904.44 cfs @ El. 290.47
Roadway Overtopping El.	290.00	294.00
Low Girder Elevation	289.44	290.89
Freeboard Provided Above 50 Year Headwater ²	-1.19 ft	1.27 ft
Span Arrangement	3 @ 19 ft	3 @ 35 ft
Finish Grade El.	291.33	294.37

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

Note: Discharges include only portions through bridge opening.

Note: Finish Grade El. and Low Girder El. are constant over the length of the bridge

¹Elevation Taken at 1st cross section upstream of bridge

²Freeboard = 50 Year Headwater Elevation – Low Girder Elevation.

Other Considerations: Utilities such as fiber optic are present along the north side of the roadway.