

## Exercise 4. Alignment and Profile: Rountree Tributary

For Unnamed Tributary to Rountree at W Main Street, use the site survey and topographic map provided below to determine the current alignment and whether to propose a new alignment. How might the alignment affect the slope of the proposed structure? Using the longitudinal profile, determine the design profile and vertical adjustment potential (VAP) lines and sketch them on the graph. The lower VAP line is the depth of the deepest residual pool depth, ignoring the plunge pool, adjusted downward to reflect scour and fill processes using criteria provided on page 3. The upper VAP is above a line connecting the top of the riffles up to the bankfull elevation or the elevation of any expected local aggradation. Sketch the proposed lower elevation for a new structure on the profile graph. It should be below the lower VAP line and the minimum depth of fill in the culvert should be  $>D_{100}$  (see page 2). Select a reference reach.

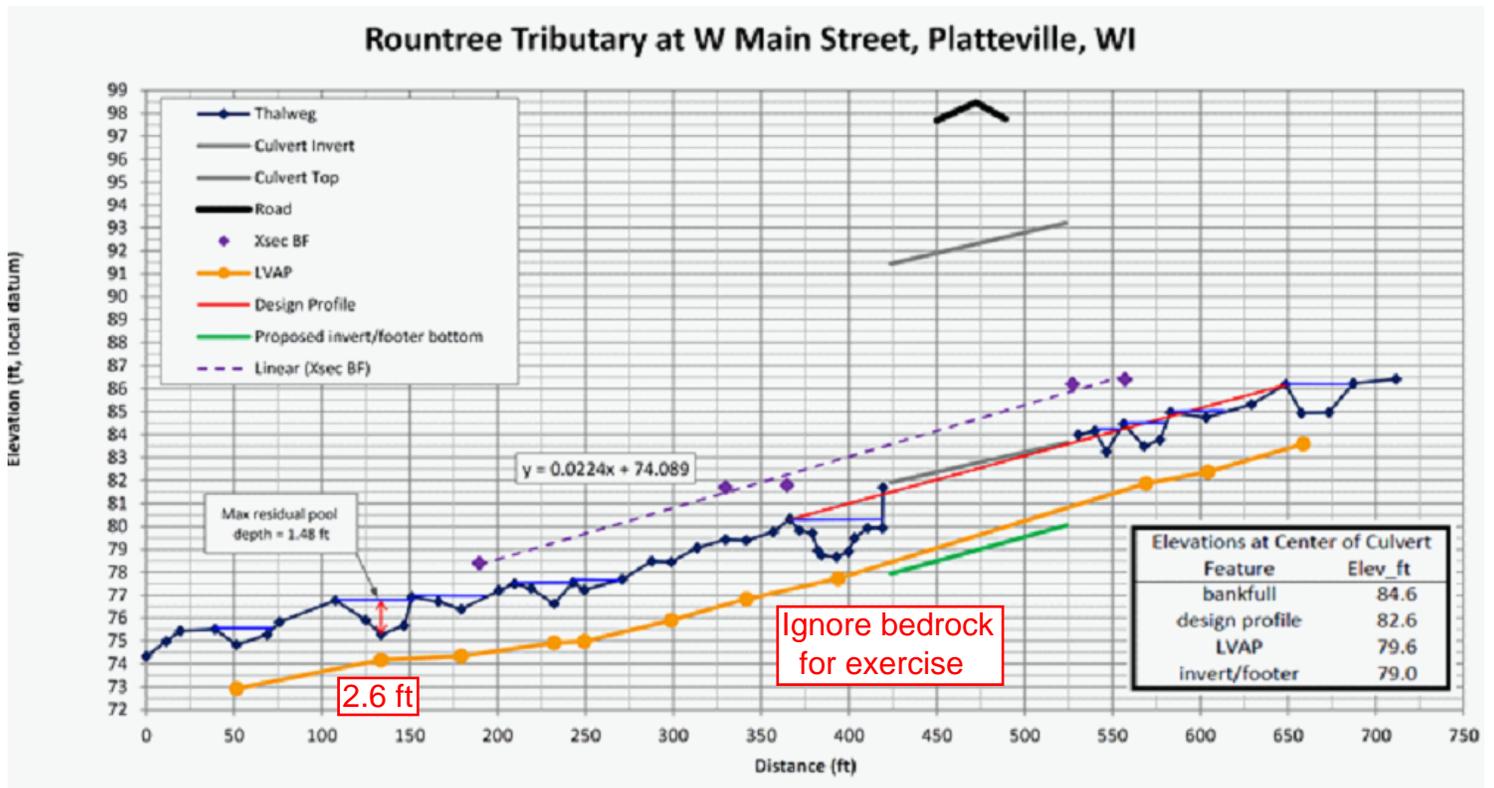
Alignment (degrees from 90° to road facing downstream): Existing 20° Proposed 20°

Maximum residual pool depth: 1.5 ft LVAP adjustment factor: 1.75 D100: 1.6 (ft) (**500 mm**)

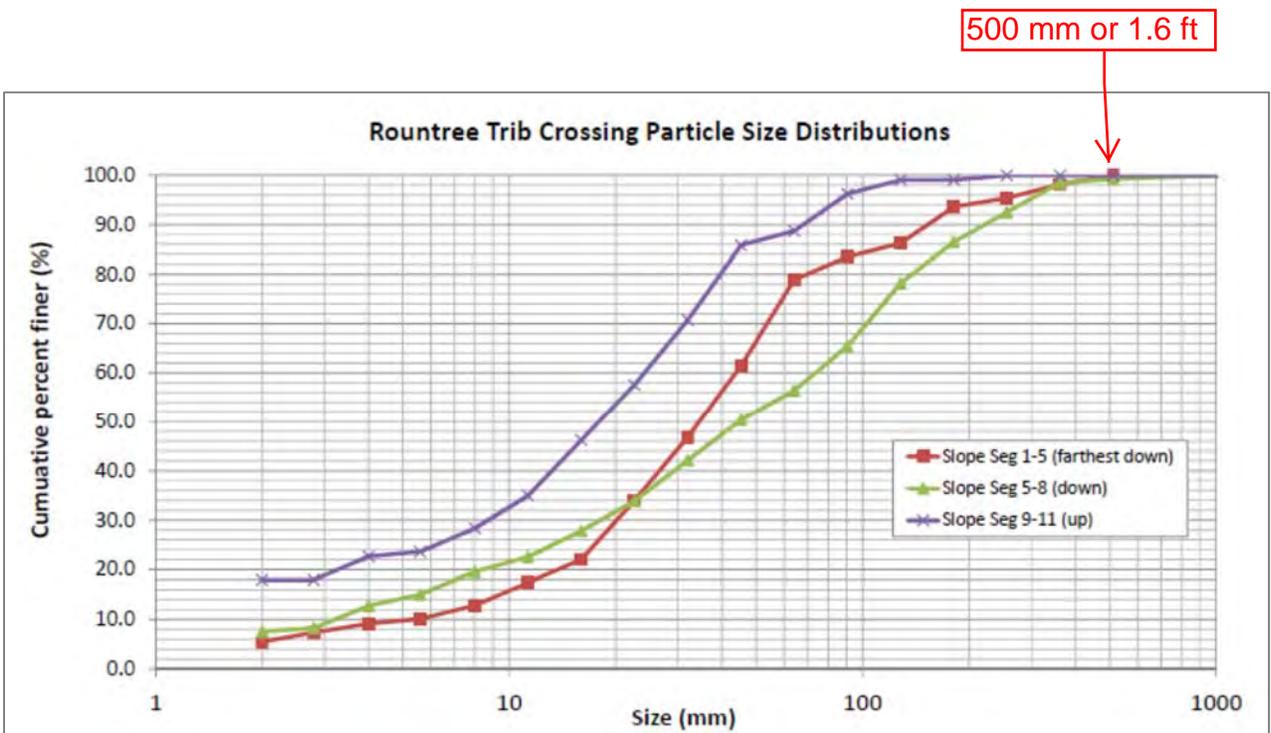
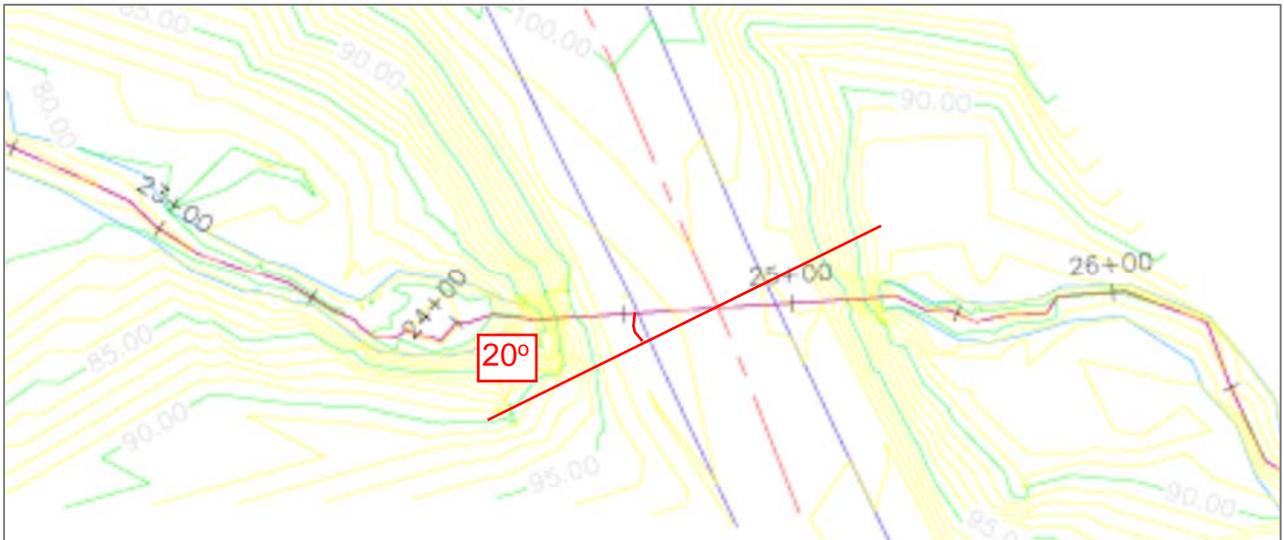
LVAP distance below design profile: 2.6 ft (max residual pool depth x LVAP adj factor, pg 3)

Slope of Design Profile (ft/ft or %): 2.1% Slope of Lower VAP Line (ft/ft or %): 2.1%

Distance from design profile elevation to bottom of structure or footer (ft): 3.5

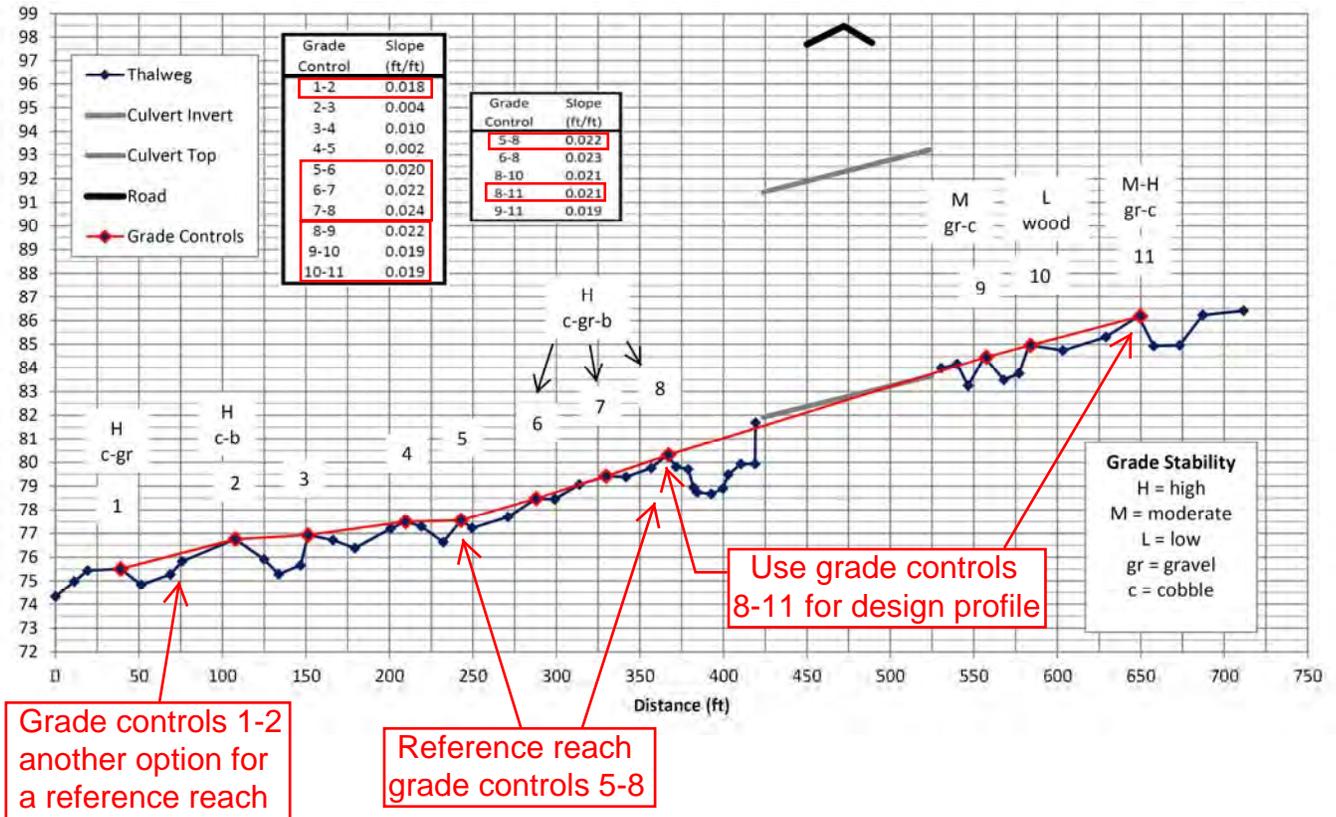


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### Rountree Tributary at W Main Street, Platteville, WI



LVAP adjustment factors to reflect scour/fill processes that occur during floods. Recommended criteria:

- 1.00 x Pool Max Depth (PMD): Step-pool channels,  $S > 5\%$ , boulder-cobble boundaries.
- 1.25 x PMD: Step-pool channels with  $S < 5\%$ , cobble-gravel boundaries.
- 1.50 x PMD: Steep riffles with ribs, cobble-gravel boundaries.
- 1.75 x PMD: Riffles, gravel-cobble boundaries.
- 2.00 x PMD: Riffles, sand-fine gravel boundaries.
- No adjustment for bedrock.