

- 1 A stream restoration project is planned for a sand bed channel that is currently straight and extremely wide due to historic channelization and straightening. The channel will be narrowed by 30 percent. Given the following data, determine the contraction scour depth for clear-water and Live-bed conditions and recommend the appropriate value.

$$S = 0.0008 \quad ; \quad n = 0.034 \quad ; \quad d_{50} = 0.3 \text{ mm} \quad ; \quad Q = 390 \text{ m}^3/\text{s}$$

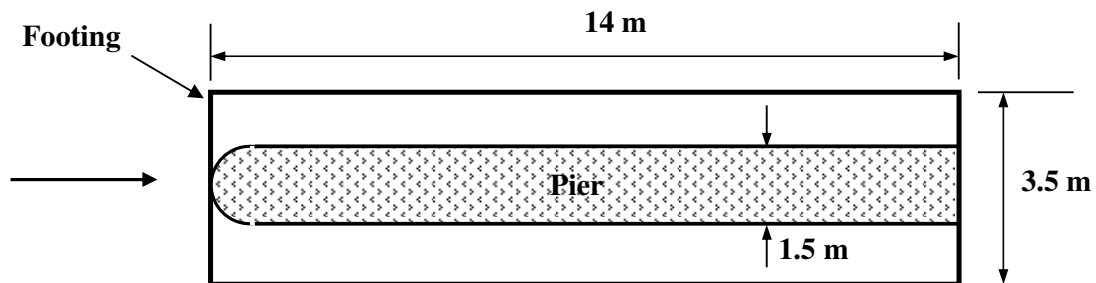
$$y_0 = 3.0 \text{ m} \quad ; \quad W = 70 \text{ m} \quad ; \quad V = 2.2 \text{ m/s}$$

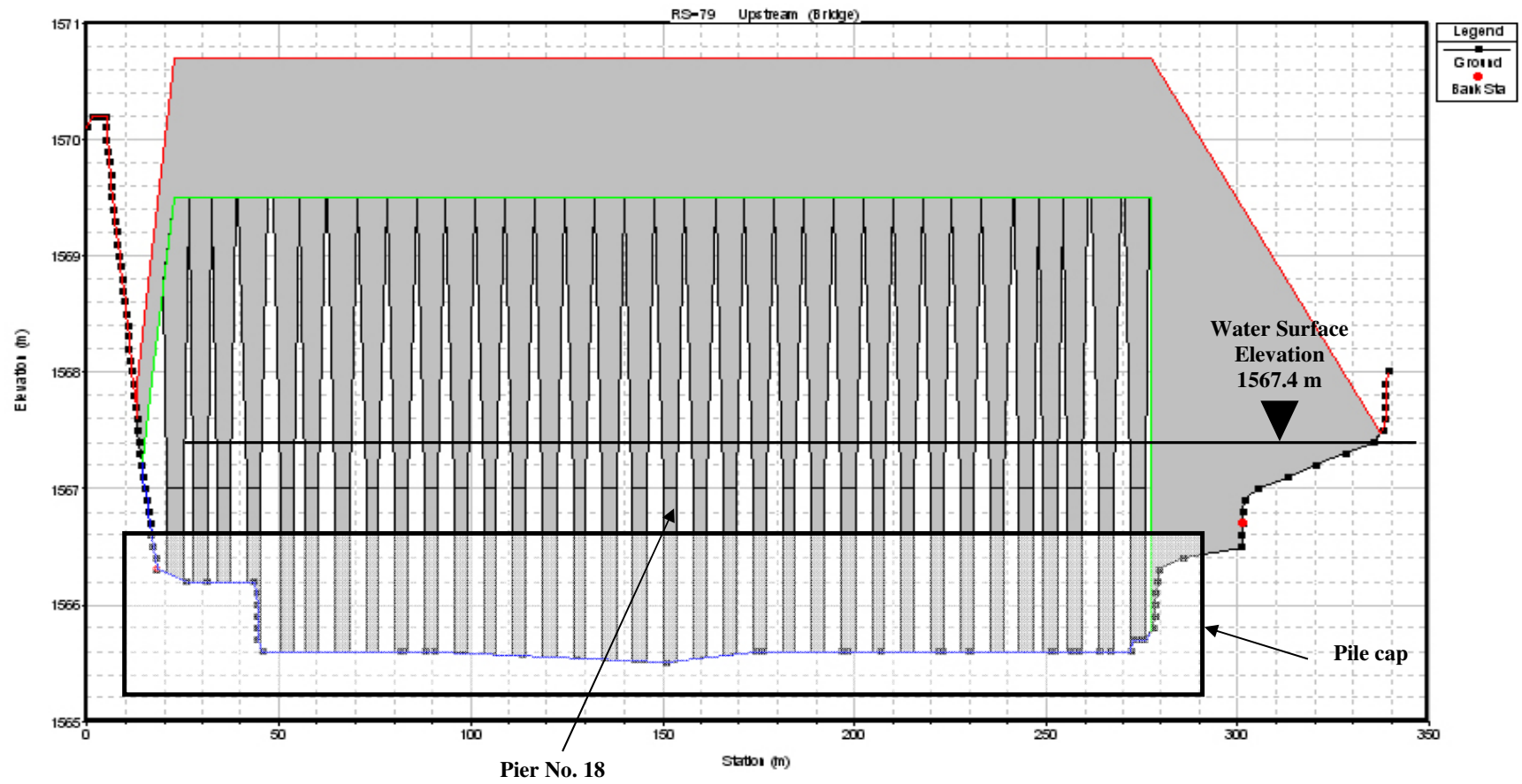
- 2 The scour evaluation of historical bridge of Sio-Se-Pol Piers with footings is requested. Although the footing is continuous across the bridge width, a simplified layout of the pier is shown below. The footing is 14 m long, 3.5 m wide and 1.4 m deep. The cross-section of the river upstream the bridge is shown in the next page. The following data are given:

$$V_0 = 1.0 \text{ m/s} \quad ; \quad S_0 = 0.00025 \quad ; \quad \alpha = 0 \quad ; \quad \text{Plane bed}$$

$$d_{50} = 2.0 \text{ mm} \quad ; \quad d_{84} = 10 \text{ mm} \quad ; \quad d_{95} = 12 \text{ mm}$$

Determine the local scour depth for pier No. 18.





- 3** An existing bridge is subjected to pressure flow to the top of a solid guard rail at the 100-year return period. The rectangular round-nose pier width is 0.90 m, aligned with the flow. The following data are given:

$$\begin{array}{llll} q = 28.6 \text{ m}^3/\text{s} & ; & V = 2.9 \text{ m/s} & ; & y = 9.75 \text{ m} & ; & d_{50} = 0.4 \text{ mm} \\ d_{84} = 0.9 \text{ mm} & ; & H_b = 7.9 \text{ m} & & & & \end{array}$$

Calculate the local pier scour.