

Estimation of permeability using the Kozeny-Carman equation was performed for four different sets of gradation data for sand material similar to the material used to construct the seepage berms along the Yuba River. The permeability calculations were performed using 1%, 1%, 11%, and 21% fines, or material passing the No. 200 sieve. The vertical permeabilities calculated are shown in the table below.

**Table 1: Summary of Permeability Calculations**

Percent Fines	Vertical Permeability
1%	$9.5 \times 10^{-2}$ cm/s
1%	$9.4 \times 10^{-2}$ cm/s
11%	$6.0 \times 10^{-3}$ cm/s
21%	$5.1 \times 10^{-4}$ cm/s

The vertical permeability used in our seepage analyses for the seepage berm material was  $6.2 \times 10^{-5}$  cm/s and resulted in a calculated exit gradient of 0.57.

Comparison of these permeability values indicates that the permeability used in our analysis is very conservative.

Refer to the attached spreadsheet showing the permeability calculations discussed above.