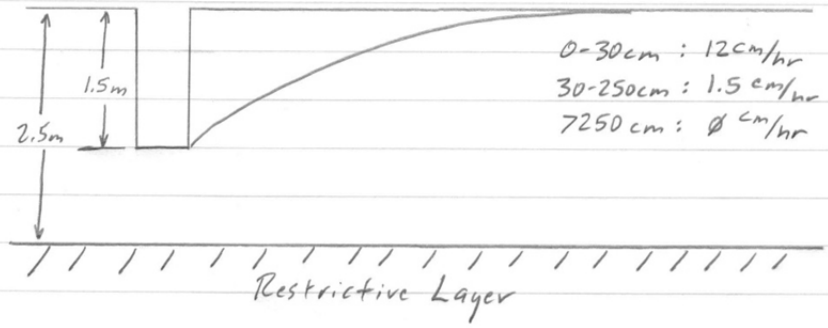

$$K_{eff} = \frac{(12\ cm/hr \times 30cm) + (1.5\ cm/hr \times 220cm)}{30\ cm + 220\ cm} = 2.76\ cm/hr \text{ or } 0.0276\ m/hr$$

$$f = \frac{1.6\ cm}{30cm} = 0.05\overline{33}$$

$$H = \frac{2.5m - 0.25m}{2.5m} = 0.9$$

$$D = \frac{2.5m - 1.5m}{2.5m} = 0.4$$

From the chart illustrating nondimensional solutions to the Boussinesq equation: $1/\eta = 0.62$

$T_{25} = 11.7$ (NCDOT Report, Table 1)

Hence,

$$x = \frac{\sqrt{\left[(0.0276\ m/hr \times 24\ hr/day)/0.05\overline{33}\right] \times 2.5m \times 11.7\ days}}{0.62}$$

$$= \boxed{30.75m \text{ or } 100.9\ ft}$$