

ESP4994e Hadden Hall Hotel, Buxton**Soakaway 1 (TP2)**

Soakaway Dimensions		
Length	Width	Depth
2.1m	1m	2m

$$\begin{aligned}
 \text{VP75} &= \text{Length (m)} \times \text{Width (m)} \times [t_{75} - t_{25}] \\
 &= 2.1 \times 1 \times [0.5] \\
 &= \underline{\underline{1.05\text{m}^3}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Ap50} &= [\text{length (m)} \times [t_{75}-t_{25}] \times 2] + [\text{width (m)} \times [t_{75}-t_{25}] \times 2] + [\text{length (m)} \times \text{width (m)}] \\
 &= [2.1 \times 0.5 \times 2] + [1 \times 0.5 \times 2] + [2.1 \times 1] \\
 &= 2.1 + 1 + 2.1 \\
 &= \underline{\underline{5.2\text{m}^2}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Time} &= [t_{p75} \text{ (mins)} - t_{p25} \text{ (mins)}] \\
 &= 33.75 - 11.25 \\
 &= \underline{\underline{22.5 \text{ minutes}}}
 \end{aligned}$$

Infiltration Rate

$$\frac{V_{p75}}{[a_{P50} \times [t_{p75}-t_{p25}] \times 60]}$$

$$\frac{1.05}{[5.2 \times 22.5 \times 60]}$$

$$\frac{1.05}{7020}$$

$$= \underline{\underline{1.5 \times 10^{-4} \text{ m/s}}}$$

Soakaway 2 (TP3)

Soakaway Dimensions		
Length	Width	Depth
2.1m	1.4m	3m

$$\begin{aligned}
 \text{VP75} &= \text{Length (m)} \times \text{Width (m)} \times [t_{75} - t_{25}] \\
 &= 2.1 \times 1.4 \times [0.65] \\
 &= \underline{\underline{1.911\text{m}^3}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Ap50} &= [\text{length (m)} \times [t_{75}-t_{25}] \times 2] + [\text{width (m)} \times [t_{75}-t_{25}] \times 2] + [\text{length (m)} \times \text{width (m)}] \\
 &= [2.1 \times 0.65 \times 2] + [1.4 \times 0.65 \times 2] + [2.1 \times 1.4] \\
 &= 2.73 + 1.82 + 2.94 \\
 &= \underline{\underline{7.49\text{m}^2}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Time} &= [t_{p75} \text{ (mins)} - t_{p25} \text{ (mins)}] \\
 &= 23.25 - 8.12 \\
 &= \underline{\underline{15.13 \text{ minutes}}}
 \end{aligned}$$

Infiltration Rate

$$\begin{aligned}
 &\frac{V_{p75}}{[a_{P50} \times [t_{p75}-t_{p25}] \times 60]}
 \end{aligned}$$

$$\begin{aligned}
 &\frac{1.911}{[7.49 \times 15.13 \times 60]}
 \end{aligned}$$

$$\begin{aligned}
 &\frac{1.911}{6799.422}
 \end{aligned}$$

$$= \underline{\underline{2.8 \times 10^{-4} \text{ m/s}}}$$