

**Cat 1 Sulfate Mass Flux to West Pit  
after Installation of Geomembrane Cover**

**Values extracted  
from deterministic  
model using P50  
inputs. P50 values  
extracted from  
monte-carlo model  
output spreadsheets**

$A_G := 541.6$ acre	Area of Cat 1 with geomembrane (Table 1-1, sheet 1)		541.6	541.6
$X_{50} := 0.00325121$	P50 percolation (P50 obtained from log-normal input to GoldSim)		0.00325121	
$R_{50} := 3.05^3 \cdot \frac{\text{in}}{\text{yr}}$	P50 rainfall (Table 1-1, sheet 5)	$R_{50} = 28.373 \cdot \frac{\text{in}}{\text{yr}}$	28.373	
$Q_{\text{perc}} := X_{50} \cdot R_{50} \cdot A_G$	P50 percolation flow rate	$Q_{\text{perc}} = 2.579 \cdot \text{gpm}$	2.575	2.25
$\text{pH} := \frac{7.8 + 8.1}{2}$	P50 Cat 1 pH for geomembrane cover (Table 1-1, sheet Table 1-1, sheet 7)	$\text{pH} = 7.95$	7.95	
$\text{Mg} := \frac{0.235127}{24.305}$ 0.235127	P50 magnesium release rate in mmole/kg/week (Table 1-24 and GoldSim to compute P50 value)	$\text{Mg} = 9.674 \times 10^{-3}$		
$\text{Ca} := \frac{1.10426}{40.078}$ 1.10426	P50 calcium release rate in mmole/kg/week (Table 1-24 and GoldSim to compute P50 value)	$\text{Ca} = 0.028$		
$\text{K} := \frac{0.191692}{39.0983}$ 0.191692	P50 potassium release rate in mmole/kg/week (Table 1-24 and GoldSim to compute P50 value)	$\text{K} = 4.903 \times 10^{-3}$		
$\text{Na} := \frac{0.227726}{22.989}$ 0.227726	P50 sodium release rate in mmole/kg/week (Table 1-24 and GoldSim to compute P50 value)	$\text{Na} = 9.906 \times 10^{-3}$		
$\text{CAP}_{\text{SO4}} := \left[ 1294 \cdot \frac{(\text{Mg} + 0.5 \cdot \text{Na} + 0.5 \cdot \text{K})}{\text{Ca}} + 1760 \right] \cdot \frac{\text{mg}}{\text{L}}$	SO4 conc into PRB based on above P50 release rates	$\text{CAP}_{\text{SO4}} = 2562 \cdot \frac{\text{mg}}{\text{L}}$	2562	
$C_{\text{SO4\_in}} := \text{CAP}_{\text{SO4}}$	Sulfate concentration of inflow into PRB (set to CAP concentration)	$C_{\text{SO4\_in}} = 2562 \cdot \frac{\text{mg}}{\text{L}}$	2562	Can't Find
$M_{\text{SO4\_in}} := Q_{\text{perc}} \cdot C_{\text{SO4\_in}}$	Mass flux of sulfate into PRB	$M_{\text{SO4\_in}} = 13.157 \cdot \frac{\text{tonne}}{\text{yr}}$	2.37 ?	Can't Find
$F_{\text{SO4}} := 50\%$	Total percent removal of sulfate in PRB		50	
$M_{\text{SO4\_out}} := (1 - F_{\text{SO4}}) \cdot Q_{\text{perc}} \cdot C_{\text{SO4\_in}}$	Mass flux of sulfate out of PRB to West Pit	$M_{\text{SO4\_out}} = 6.579 \cdot \frac{\text{tonne}}{\text{yr}}$	Can't Find	0.727
$C_{\text{SO4\_out}} := \frac{M_{\text{SO4\_out}}}{Q_{\text{perc}}}$	Sulfate concentration in water out of PRB to West Pit	$C_{\text{SO4\_out}} = 1281 \cdot \frac{\text{mg}}{\text{L}}$	Can't Find	93.9