



## Stone Strong Gravity Height Calculations

### Gravity Height (No Extensions)

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	150 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	9.0 ft.	7.5 ft.	9.0 ft.	7.5 ft.
Sand, $\phi = 30^\circ$	10.5 ft.	7.5 ft.	10.5 ft.	7.5 ft.	
Sand/Gravel, $\phi = 34^\circ$	12.0 ft.	10.5 ft.	10.5 ft.	10.5 ft.	
Crushed Stone, $\phi = 38^\circ$	13.5 ft.	12.0 ft.	12.0 ft.	12.0 ft.	

### Gravity Height w/ 12" Mass Extender

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	150 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	12.0 ft.	9.0 ft.	12.0 ft.	9.0 ft.
Sand, $\phi = 30^\circ$	13.5 ft.	10.5 ft.	13.5 ft.	10.5 ft.	
Sand/Gravel, $\phi = 34^\circ$	15.0 ft.	13.5 ft.	13.5 ft.	13.5 ft.	
Crushed Stone, $\phi = 38^\circ$	18.0 ft.	15.0 ft.	15.0 ft.	15.0 ft.	

### Gravity Height w/ 24" Tail Extension

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	150 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	13.5 ft.	10.5 ft.	13.5 ft.	10.5 ft.
Sand, $\phi = 30^\circ$	16.5 ft.	13.5 ft.	15.0 ft.	12.0 ft.	
Sand/Gravel, $\phi = 34^\circ$	18.0 ft.	16.5 ft.	16.5 ft.	16.5 ft.	
Crushed Stone, $\phi = 38^\circ$	21.0 ft.	18.0 ft.	19.5 ft.	18.0 ft.	



## Stone Strong Gravity Height Calculations (AASHTO)

### Gravity Height (No Extensions)

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		7.5 ft.	4.5 ft.	7.5 ft.	6.0 ft.
Sand, $\phi = 30^\circ$		9.0 ft.	6.0 ft.	7.5 ft.	7.5 ft.
Sand/Gravel, $\phi = 34^\circ$		10.5 ft.	7.5 ft.	9.0 ft.	9.0 ft.
Crushed Stone, $\phi = 38^\circ$		10.5 ft.	7.5 ft.	9.0 ft.	10.5 ft.

### Gravity Height w/ 12" Mass Extender

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		10.5 ft.	7.5 ft.	9.0 ft.	9.0 ft.
Sand, $\phi = 30^\circ$		10.5 ft.	7.5 ft.	10.5 ft.	9.0 ft.
Sand/Gravel, $\phi = 34^\circ$		12.0 ft.	9.0 ft.	10.5 ft.	10.5 ft.
Crushed Stone, $\phi = 38^\circ$		13.5 ft.	10.5 ft.	12.0 ft.	12.0 ft.

### Gravity Height w/ 24" Tail Extension

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		12.0 ft.	9.0 ft.	12.0 ft.	10.5 ft.
Sand, $\phi = 30^\circ$		13.5 ft.	10.5 ft.	12.0 ft.	12.0 ft.
Sand/Gravel, $\phi = 34^\circ$		15.0 ft.	12.0 ft.	13.5 ft.	13.5 ft.
Crushed Stone, $\phi = 38^\circ$		16.5 ft.	13.5 ft.	15.0 ft.	15.0 ft.



## Stone Strong Gravity Height Calculations (AASHTO - metric)

### Gravity Height (No Extensions)

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 kPa	10 kPa	0 kPa	0 kPa
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		2.3 m	1.4 m	2.3 m	1.8 m
Sand, $\phi = 30^\circ$		2.7 m	1.8 m	2.3 m	2.3 m
Sand/Gravel, $\phi = 34^\circ$		3.2 m	2.3 m	2.7 m	2.7 m
Crushed Stone, $\phi = 38^\circ$		3.2 m	2.7 m	2.7 m	3.2 m

### Gravity Height w/ 0.31m Mass Extender

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 kPa	10 kPa	0 kPa	0 kPa
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		3.2 m	2.3 m	2.7 m	2.3 m
Sand, $\phi = 30^\circ$		3.2 m	2.7 m	3.2 m	2.7 m
Sand/Gravel, $\phi = 34^\circ$		3.7 m	2.7 m	3.2 m	3.2 m
Crushed Stone, $\phi = 38^\circ$		4.1 m	3.2 m	3.7 m	3.7 m

### Gravity Height w/ 0.61m Tail Extension

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 kPa	10 kPa	0 kPa	0 kPa
	Seismic PGA	0g	0g	0.15g	0g
Clay, $\phi = 26^\circ$		3.7 m	3.2 m	3.7 m	2.7 m
Sand, $\phi = 30^\circ$		4.1 m	3.2 m	4.1 m	3.2 m
Sand/Gravel, $\phi = 34^\circ$		4.6 m	3.7 m	4.1 m	4.1 m
Crushed Stone, $\phi = 38^\circ$		5.0 m	4.1 m	4.6 m	4.6 m



## Stone Strong Gravity Height Calculations (AASHTO - LRFD)

### Gravity Height (No Extensions)

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	7.5 ft.	4.5 ft.	7.5 ft.	6.0 ft.
Sand, $\phi = 30^\circ$	7.5 ft.	6.0 ft.	7.5 ft.	7.5 ft.	
Sand/Gravel, $\phi = 34^\circ$	9.0 ft.	6.0 ft.	9.0 ft.	7.5 ft.	
Crushed Stone, $\phi = 38^\circ$	10.5 ft.	7.5 ft.	10.5 ft.	9.0 ft.	

### Gravity Height w/ 12" Mass Extender

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	9.0 ft.	7.5 ft.	9.0 ft.	7.5 ft.
Sand, $\phi = 30^\circ$	10.5 ft.	7.5 ft.	10.5 ft.	9.0 ft.	
Sand/Gravel, $\phi = 34^\circ$	12.0 ft.	9.0 ft.	12.0 ft.	10.5 ft.	
Crushed Stone, $\phi = 38^\circ$	13.5 ft.	10.5 ft.	13.5 ft.	12.0 ft.	

### Gravity Height w/ 24" Tail Extension

Soil Type	Backfill Slope	Level	Level	Level	3H:1V
	Surcharge	0 psf	250 psf	0 psf	0 psf
	Seismic PGA	0g	0g	0.15g	0g
	Clay, $\phi = 26^\circ$	12.0 ft.	9.0 ft.	12.0 ft.	9.0 ft.
Sand, $\phi = 30^\circ$	13.5 ft.	10.5 ft.	13.5 ft.	10.5 ft.	
Sand/Gravel, $\phi = 34^\circ$	15.0 ft.	12.0 ft.	15.0 ft.	13.5 ft.	
Crushed Stone, $\phi = 38^\circ$	16.5 ft.	13.5 ft.	16.5 ft.	15.0 ft.	