

Proposed Gabion Retaining Wall at:

25, Heol Corn Ddu, Beacon Heights
Merthyr Tydfil

Jan-24

Ref	Calculations	Output
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$$\text{Weight of Soil} = 16 \text{ Kg/m}^3$$

$$\text{Weight of Stone Fill} = 19 \text{ Kg/m}^3$$

$$\text{Weight of Concrete} =$$

$$\text{Height of Retaining Wall} = 2.20 \text{ m}$$

$$\text{Horizontal Thrust } P_a = gh$$

$$P_a = 8.67 \text{ Kn/lin m}$$

$$\text{Rankines Coefficient } (K_a) = \frac{1 - \sin \theta}{1 + \sin \theta}$$

$$\text{Where } \theta = 35^\circ \quad \text{Tan}35^\circ = 0.70$$

$$K_a = 0.271$$

$$\text{Active Pressure } P_A = 0.50 K_a gh^2$$

$$\text{At Section 1-1 } P_A = 0.09 \text{ Kn/m}^2$$

$$\text{At Section 2-2 } P_A = 3.12 \text{ Kn/m}^2$$

$$\text{At Section 3-3 } P_A = 11.33 \text{ Kn/m}^2$$

$$\text{Basket Density (80\% of full)} = 15.20 \text{ Kn/m}^2 \quad \emptyset$$

Overturning Moment at Section 1-1

$$= 0.09 \times 0.067$$

$$= 0.01 \text{ Knm} \quad 0.01 \text{ Knm}$$

Balancing Moments about pivot 'A'

$$\text{Stone} \quad 0.200 \times 1.00 \times 15.20 = 3.04 \times 0.500 = 1.520$$

Therefore

$$\text{Factor of Safety (Overturning)} = \boxed{262.9} \quad \text{Satisfactory}$$

Overturning Moment at Section 2-2

$$\begin{aligned} &= 3.12 \times 0.400 \\ &= 1.25 \text{ Knm} \end{aligned}$$

1.25 Knm

Balancing Moments about pivot 'A'

Stone

$$1.200 \times 1.00 \times 15.20 = \frac{\text{Kn}}{18.24} \times 0.500 = \frac{\text{Knm}}{9.120}$$

Therefore

Factor of Safety (Overturning) =

7.30

Satisfactory

Overturning Moment at Section 3-3

$$\begin{aligned} &= 11.33 \times 0.733 \\ &= 8.31 \text{ Knm} \end{aligned}$$

8.31 Knm

Balancing Moments about pivot 'A'

Stone

$$2.200 \times 1.00 \times 15.20 = \frac{\text{Kn}}{33.44} \times 0.500 = \frac{\text{Knm}}{16.720}$$

Therefore

Factor of Safety (Overturning) =

2.01

Satisfactory

Check Sliding

$$\begin{aligned} R_s &= W \times 2/3 \tan \theta \\ &= \underline{15.61} \text{ Kn} \end{aligned}$$

Factor of Safety against Sliding =

7.09

Satisfactory

Ground Bearing Pressure

Assumed GBP taken as 100 Kn/m²

$$P = \frac{R}{b} \pm \frac{M}{z}$$

Where:

$$b = 1.00 \text{ m}$$

$$d = 2.00 \text{ m}$$

and

$$z = d^2/6 = 0.667 \text{ m}^2$$

$$\begin{aligned} P_{\max} &= 33.44 + 12.46 \\ &= \underline{45.90} \text{ Kn/m}^2 \end{aligned}$$

$$\begin{aligned} P_{\min} &= 33.44 - 12.46 \\ &= \underline{20.98} \text{ Kn/m}^2 \end{aligned}$$

Factor of Safety = 2.18

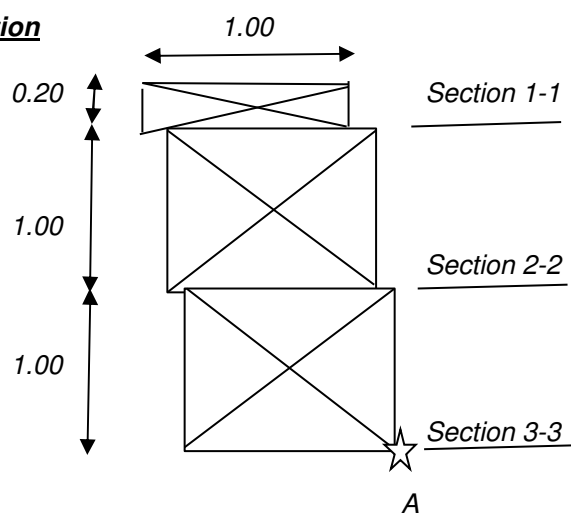
Satisfactory

Summary

**The 'Gabion' baskets are to be positioned in brick bond ie no straight vertical joints.
If, during construction any soft spots are evident, these should be removed and filled
suitable hardcore compacted in 150mm thick layers.**

Baskets to be hand -filled with clean stone.

Gabion Wall Section



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