

Proposed Gabion Retaining Wall at:

**Building Plot,
Queens Road,
Merthyr Tydfil**

May-21

Ref	Calculations	Output
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Weight of Soil = 16 Kg/m³

Weight of Stone Fill = 19 Kg/m³

Weight of Concrete =

Height of Retaining Wall = 2.00 m

Horizontal Thrust Pa = gh

Pa = 7.95 Kn/lin m

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

Where $\theta = 37^\circ$ Tan35⁰ = 0.75

K_A = 0.249

Active Pressure P_A = 0.50 K_A gh²

At Section 1-1 P_A = 1.99 Kn/m²

At Section 2-2 P_A = 7.95 Kn/m²

At Section 3-3 P_A = 17.90 Kn/m²

Basket Density (80% of full) = 15.20 Kn/m² Ø

Overturning Moment at Section 1-1

$$= 1.99 \times 0.333$$

$$= 0.66 \text{ Knm}$$

$$0.66 \text{ Knm}$$

Balancing Moments about pivot 'A'

Stone

$$1.000 \times 1.00 \times 15.20 = 15.20 \times 0.500 = 7.600 \text{ Knm}$$

Therefore

Factor of Safety (Overturning) =

11.46

Satisfactory

Overturning Moment at Section 2-2

$$\begin{aligned} &= 7.95 \times 0.667 \\ &= 5.30 \text{ Knm} \end{aligned}$$

5.30 Knm

Balancing Moments about pivot 'A'

Stone

$$2.000 \times 1.00 \times 15.20 = \frac{\text{Kn}}{30.40} \times 1.000 = \frac{\text{Knm}}{30.400}$$

Therefore

Factor of Safety (Overturning) =

5.73

Satisfactory

Check Sliding

$$\begin{aligned} R_s &= W \times 2/3 \tan \theta \\ &= \underline{15.20} \text{ Kn} \end{aligned}$$

Factor of Safety against Sliding =

1.91

Satisfactory

Overturning Moment at Section 3-3

$$\begin{aligned} &= 17.90 \times 1.000 \\ &= 17.90 \text{ Knm} \end{aligned}$$

17.90 Knm

Balancing Moments about pivot 'A'

Stone

$$3.000 \times 1.00 \times 15.20 = \frac{\text{Kn}}{45.60} \times 1.500 = \frac{\text{Knm}}{68.400}$$

Therefore

Factor of Safety (Overturning) =

3.82

Satisfactory

Check Sliding

$$\begin{aligned} R_s &= W \times 2/3 \tan \theta \\ &= \underline{22.80} \text{ Kn} \end{aligned}$$

Factor of Safety against Sliding =

1.27

Unsatisfactory

Considered ok

Bearing Pressure

$$P_{max} = W/b + M/z$$

$$P_{min} = W/b - M/z$$

At Level 3-3

$$\begin{aligned} W &= 45.60 \text{ Kn} & b &= 1.00 \text{ m} \\ M &= 68.40 \text{ Knm} & z &= bd^2/6 = 1.50 \text{ m}^3 \end{aligned}$$

$$P_{max} = 91.20 \text{ Kn/m}^2$$

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

