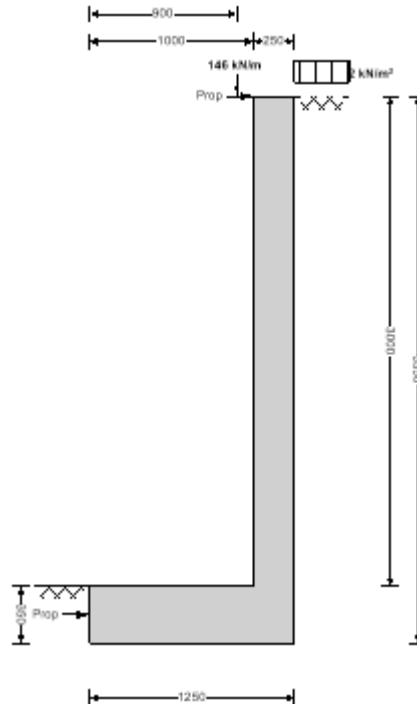


Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 1	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

RETAINING WALL ANALYSIS (BS 8002:1994)

TEDDS calculation version 1.2.01.08



Wall details

Retaining wall type
 Height of retaining wall stem
 Thickness of wall stem
 Length of toe
 Length of heel
 Overall length of base
 Thickness of base
 Depth of downstand
 Position of downstand
 Thickness of downstand
 Height of retaining wall
 Depth of cover in front of wall
 Depth of unplanned excavation
 Height of ground water behind wall
 Height of saturated fill above base
 Density of wall construction
 Density of base construction
 Angle of rear face of wall
 Angle of soil surface behind wall
 Effective height at virtual back of wall

Cantilever propped at both

$h_{\text{stem}} = 3000$ mm
 $t_{\text{wall}} = 250$ mm
 $l_{\text{toe}} = 1000$ mm
 $l_{\text{heel}} = 0$ mm
 $l_{\text{base}} = l_{\text{toe}} + l_{\text{heel}} + t_{\text{wall}} = 1250$ mm
 $t_{\text{base}} = 350$ mm
 $d_{\text{ds}} = 0$ mm
 $l_{\text{ds}} = 900$ mm
 $t_{\text{ds}} = 350$ mm
 $h_{\text{wall}} = h_{\text{stem}} + t_{\text{base}} + d_{\text{ds}} = 3350$ mm
 $d_{\text{cover}} = 0$ mm
 $d_{\text{exc}} = 0$ mm
 $h_{\text{water}} = 0$ mm
 $h_{\text{sat}} = \max(h_{\text{water}} - t_{\text{base}} - d_{\text{ds}}, 0 \text{ mm}) = 0$ mm
 $\gamma_{\text{wall}} = 23.6$ kN/m³
 $\gamma_{\text{base}} = 23.6$ kN/m³
 $\alpha = 90.0$ deg
 $\beta = 0.0$ deg
 $h_{\text{eff}} = h_{\text{wall}} + l_{\text{heel}} \times \tan(\beta) = 3350$ mm

Retained material details

Mobilisation factor
 $M = 1.5$
 Moist density of retained material
 $\gamma_m = 18.0$ kN/m³

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 2	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

Saturated density of retained material $\gamma_s = 21.0 \text{ kN/m}^3$

Design shear strength $\phi' = 24.2 \text{ deg}$

Angle of wall friction $\delta = 0.0 \text{ deg}$

Base material details

Moist density $\gamma_{mb} = 18.0 \text{ kN/m}^3$

Design shear strength $\phi'_b = 24.2 \text{ deg}$

Design base friction $\delta_b = 18.6 \text{ deg}$

Allowable bearing pressure $P_{\text{bearing}} = 150 \text{ kN/m}^2$

Using Coulomb theory

Active pressure coefficient for retained material

$$K_a = \sin(\alpha + \phi')^2 / (\sin(\alpha)^2 \times \sin(\alpha - \delta) \times [1 + \sqrt{(\sin(\phi' + \delta) \times \sin(\phi' - \beta) / (\sin(\alpha - \delta) \times \sin(\alpha + \beta)))^2}] = 0.419$$

Passive pressure coefficient for base material

$$K_p = \sin(90 - \phi'_b)^2 / (\sin(90 - \delta_b) \times [1 - \sqrt{(\sin(\phi'_b + \delta_b) \times \sin(\phi'_b) / (\sin(90 + \delta_b)))^2}] = 4.187$$

At-rest pressure

At-rest pressure for retained material $K_0 = 1 - \sin(\phi') = 0.590$

Loading details

Surcharge load on plan Surcharge = **1.5 kN/m²**

Applied vertical dead load on wall $W_{\text{dead}} = 134.0 \text{ kN/m}$

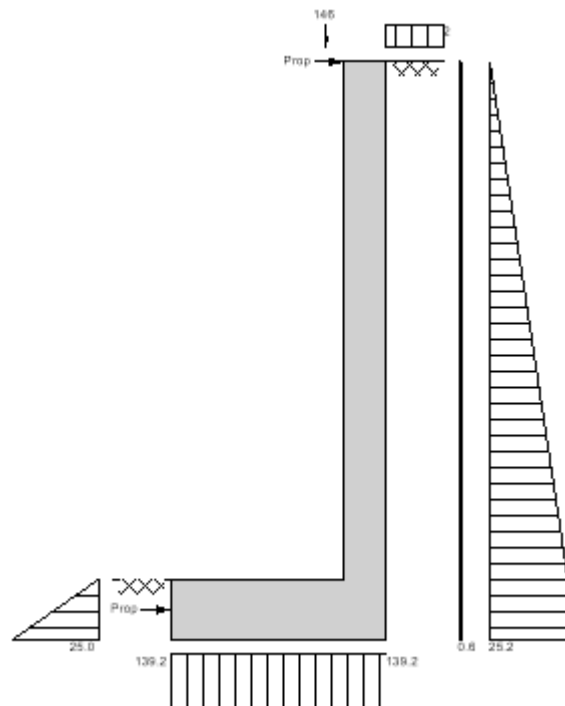
Applied vertical live load on wall $W_{\text{live}} = 12.0 \text{ kN/m}$

Position of applied vertical load on wall $l_{\text{load}} = 900 \text{ mm}$

Applied horizontal dead load on wall $F_{\text{dead}} = 0.0 \text{ kN/m}$

Applied horizontal live load on wall $F_{\text{live}} = 0.0 \text{ kN/m}$

Height of applied horizontal load on wall $h_{\text{load}} = 0 \text{ mm}$



Loads shown in kN/m, pressures shown in kN/m²

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 3	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

Vertical forces on wall

Wall stem	$W_{wall} = h_{stem} \times t_{wall} \times \gamma_{wall} = 17.7 \text{ kN/m}$
Wall base	$W_{base} = l_{base} \times t_{base} \times \gamma_{base} = 10.3 \text{ kN/m}$
Applied vertical load	$W_v = W_{dead} + W_{live} = 146 \text{ kN/m}$
Total vertical load	$W_{total} = W_{wall} + W_{base} + W_v = 174 \text{ kN/m}$

Horizontal forces on wall

Surcharge	$F_{sur} = K_a \times \text{Surcharge} \times h_{eff} = 2.1 \text{ kN/m}$
Moist backfill above water table	$F_{m_a} = 0.5 \times K_a \times \gamma_m \times (h_{eff} - h_{water})^2 = 42.3 \text{ kN/m}$
Total horizontal load	$F_{total} = F_{sur} + F_{m_a} = 44.4 \text{ kN/m}$

Calculate total propping force

Passive resistance of soil in front of wall	$F_p = 0.5 \times K_p \times \cos(\delta_b) \times (d_{cover} + t_{base} + d_{ds} - d_{exc})^2 \times \gamma_{mb} = 4.4 \text{ kN/m}$
Propping force	$F_{prop} = \max(F_{total} - F_p - (W_{total} - W_{live}) \times \tan(\delta_b), 0 \text{ kN/m})$ $F_{prop} = 0.0 \text{ kN/m}$

Overturning moments

Surcharge	$M_{sur} = F_{sur} \times (h_{eff} - 2 \times d_{ds}) / 2 = 3.5 \text{ kNm/m}$
Moist backfill above water table	$M_{m_a} = F_{m_a} \times (h_{eff} + 2 \times h_{water} - 3 \times d_{ds}) / 3 = 47.2 \text{ kNm/m}$
Total overturning moment	$M_{ot} = M_{sur} + M_{m_a} = 50.7 \text{ kNm/m}$

Restoring moments

Wall stem	$M_{wall} = W_{wall} \times (l_{toe} + t_{wall} / 2) = 19.9 \text{ kNm/m}$
Wall base	$M_{base} = W_{base} \times l_{base} / 2 = 6.5 \text{ kNm/m}$
Design vertical dead load	$M_{dead} = W_{dead} \times l_{load} = 120.6 \text{ kNm/m}$
Total restoring moment	$M_{rest} = M_{wall} + M_{base} + M_{dead} = 147 \text{ kNm/m}$

Check bearing pressure

Total vertical reaction	$R = W_{total} = 174.0 \text{ kN/m}$
Distance to reaction	$X_{bar} = l_{base} / 2 = 625 \text{ mm}$
Eccentricity of reaction	$e = \text{abs}((l_{base} / 2) - X_{bar}) = 0 \text{ mm}$ <i>Reaction acts within middle third of base</i>
Bearing pressure at toe	$p_{toe} = (R / l_{base}) - (6 \times R \times e / l_{base}^2) = 139.2 \text{ kN/m}^2$
Bearing pressure at heel	$p_{heel} = (R / l_{base}) + (6 \times R \times e / l_{base}^2) = 139.2 \text{ kN/m}^2$

PASS - Maximum bearing pressure is less than allowable bearing pressure

Calculate propping forces to top and base of wall

Propping force to top of wall	$F_{prop_top} = (M_{ot} - M_{rest} + R \times l_{base} / 2 - F_{prop} \times t_{base} / 2) / (h_{stem} + t_{base} / 2) = 3.945 \text{ kN/m}$
Propping force to base of wall	$F_{prop_base} = F_{prop} - F_{prop_top} = -3.945 \text{ kN/m}$

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 4	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

RETAINING WALL DESIGN (BS 8002:1994)

TEDDS calculation version 1.2.01.08

Ultimate limit state load factors

Dead load factor	$\gamma_{f,d} = 1.4$
Live load factor	$\gamma_{f,l} = 1.6$
Earth and water pressure factor	$\gamma_{f,e} = 1.4$

Factored vertical forces on wall

Wall stem	$W_{wall,f} = \gamma_{f,d} \times h_{stem} \times t_{wall} \times \gamma_{wall} = 24.8 \text{ kN/m}$
Wall base	$W_{base,f} = \gamma_{f,e} \times l_{base} \times t_{base} \times \gamma_{base} = 14.5 \text{ kN/m}$
Applied vertical load	$W_{v,f} = \gamma_{f,d} \times W_{dead} + \gamma_{f,l} \times W_{live} = 206.8 \text{ kN/m}$
Total vertical load	$W_{total,f} = W_{wall,f} + W_{base,f} + W_{v,f} = 246 \text{ kN/m}$

Factored horizontal at-rest forces on wall

Surcharge	$F_{sur,f} = \gamma_{f,l} \times K_0 \times \text{Surcharge} \times h_{eff} = 4.7 \text{ kN/m}$
Moist backfill above water table	$F_{m,a,f} = \gamma_{f,e} \times 0.5 \times K_0 \times \gamma_m \times (h_{eff} - h_{water})^2 = 83.4 \text{ kN/m}$
Total horizontal load	$F_{total,f} = F_{sur,f} + F_{m,a,f} = 88.2 \text{ kN/m}$

Calculate total propping force

Passive resistance of soil in front of wall kN/m	$F_{p,f} = \gamma_{f,e} \times 0.5 \times K_p \times \cos(\delta_b) \times (d_{cover} + t_{base} + d_{ds} - d_{exc})^2 \times \gamma_{mb} = 6.1$
Propping force	$F_{prop,f} = \max(F_{total,f} - F_{p,f} - (W_{total,f} - \gamma_{f,l} \times W_{live}) \times \tan(\delta_b), 0 \text{ kN/m})$ $F_{prop,f} = 5.7 \text{ kN/m}$

Factored overturning moments

Surcharge	$M_{sur,f} = F_{sur,f} \times (h_{eff} - 2 \times d_{ds}) / 2 = 7.9 \text{ kNm/m}$
Moist backfill above water table	$M_{m,a,f} = F_{m,a,f} \times (h_{eff} + 2 \times h_{water} - 3 \times d_{ds}) / 3 = 93.2 \text{ kNm/m}$
Total overturning moment	$M_{ot,f} = M_{sur,f} + M_{m,a,f} = 101.1 \text{ kNm/m}$

Restoring moments

Wall stem	$M_{wall,f} = W_{wall,f} \times (l_{toe} + t_{wall} / 2) = 27.9 \text{ kNm/m}$
Wall base	$M_{base,f} = W_{base,f} \times l_{base} / 2 = 9 \text{ kNm/m}$
Design vertical load	$M_{v,f} = W_{v,f} \times l_{load} = 186.1 \text{ kNm/m}$
Total restoring moment	$M_{rest,f} = M_{wall,f} + M_{base,f} + M_{v,f} = 223 \text{ kNm/m}$

Factored bearing pressure

Total vertical reaction	$R_f = W_{total,f} = 246.0 \text{ kN/m}$
Distance to reaction	$X_{bar,f} = l_{base} / 2 = 625 \text{ mm}$
Eccentricity of reaction	$e_f = \text{abs}((l_{base} / 2) - X_{bar,f}) = 0 \text{ mm}$ <i>Reaction acts within middle third of base</i>
Bearing pressure at toe	$p_{toe,f} = (R_f / l_{base}) - (6 \times R_f \times e_f / l_{base}^2) = 196.8 \text{ kN/m}^2$
Bearing pressure at heel	$p_{heel,f} = (R_f / l_{base}) + (6 \times R_f \times e_f / l_{base}^2) = 196.8 \text{ kN/m}^2$
Rate of change of base reaction	$\text{rate} = (p_{toe,f} - p_{heel,f}) / l_{base} = 0.00 \text{ kN/m}^2/\text{m}$
Bearing pressure at stem / toe	$p_{stem_toe,f} = \max(p_{toe,f} - (\text{rate} \times l_{toe}), 0 \text{ kN/m}^2) = 196.8 \text{ kN/m}^2$
Bearing pressure at mid stem	$p_{stem_mid,f} = \max(p_{toe,f} - (\text{rate} \times (l_{toe} + t_{wall} / 2)), 0 \text{ kN/m}^2) = 196.8 \text{ kN/m}^2$
Bearing pressure at stem / heel	$p_{stem_heel,f} = \max(p_{toe,f} - (\text{rate} \times (l_{toe} + t_{wall})), 0 \text{ kN/m}^2) = 196.8 \text{ kN/m}^2$

Calculate propping forces to top and base of wall

Propping force to top of wall	$F_{prop_top,f} = (M_{ot,f} - M_{rest,f} + R_f \times l_{base} / 2 - F_{prop,f} \times t_{base} / 2) / (h_{stem} + t_{base} / 2) = 9.719 \text{ kN/m}$
Propping force to base of wall	$F_{prop_base,f} = F_{prop,f} - F_{prop_top,f} = -3.999 \text{ kN/m}$

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 5	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

Design of reinforced concrete retaining wall toe (BS 8002:1994)

Material properties

Characteristic strength of concrete $f_{cu} = 35 \text{ N/mm}^2$
Characteristic strength of reinforcement $f_y = 500 \text{ N/mm}^2$

Base details

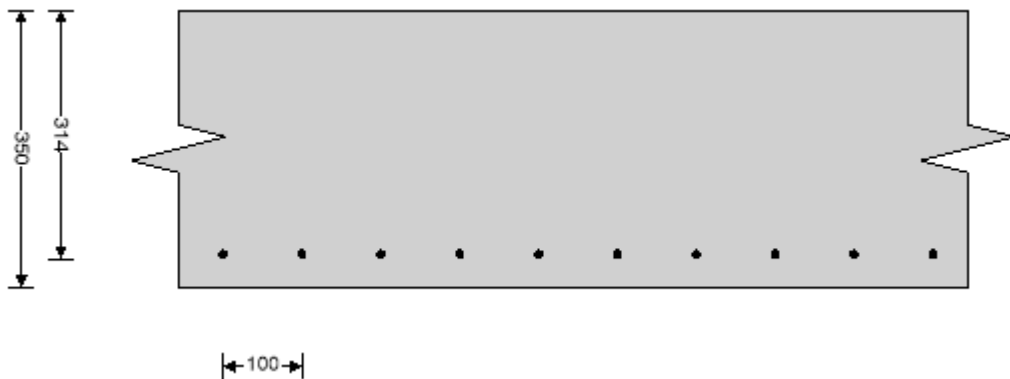
Minimum area of reinforcement $k = 0.13 \%$
Cover to reinforcement in toe $C_{toe} = 30 \text{ mm}$

Calculate shear for toe design

Shear from bearing pressure $V_{toe_bear} = (p_{toe_f} + p_{stem_toe_f}) \times l_{toe} / 2 = 196.8 \text{ kN/m}$
Shear from weight of base $V_{toe_wt_base} = \gamma_{f_d} \times \gamma_{base} \times l_{toe} \times t_{base} = 11.6 \text{ kN/m}$
Total shear for toe design $V_{toe} = V_{toe_bear} - V_{toe_wt_base} = 185.3 \text{ kN/m}$

Calculate moment for toe design

Moment from bearing pressure $M_{toe_bear} = (2 \times p_{toe_f} + p_{stem_mid_f}) \times (l_{toe} + t_{wall} / 2)^2 / 6 = 124.6 \text{ kNm/m}$
Moment from weight of base $M_{toe_wt_base} = (\gamma_{f_d} \times \gamma_{base} \times t_{base} \times (l_{toe} + t_{wall} / 2)^2 / 2) = 7.3 \text{ kNm/m}$
Total moment for toe design $M_{toe} = M_{toe_bear} - M_{toe_wt_base} = 117.2 \text{ kNm/m}$



Check toe in bending

Width of toe $b = 1000 \text{ mm/m}$
Depth of reinforcement $d_{toe} = t_{base} - C_{toe} - (\phi_{toe} / 2) = 314.0 \text{ mm}$
Constant $K_{toe} = M_{toe} / (b \times d_{toe}^2 \times f_{cu}) = 0.034$

Compression reinforcement is not required

Lever arm $Z_{toe} = \min(0.5 + \sqrt{(0.25 - (\min(K_{toe}, 0.225) / 0.9))}, 0.95) \times d_{toe}$
 $Z_{toe} = 298 \text{ mm}$

Area of tension reinforcement required $A_{s_toe_des} = M_{toe} / (0.87 \times f_y \times Z_{toe}) = 903 \text{ mm}^2/\text{m}$

Minimum area of tension reinforcement $A_{s_toe_min} = k \times b \times t_{base} = 455 \text{ mm}^2/\text{m}$

Area of tension reinforcement required $A_{s_toe_req} = \text{Max}(A_{s_toe_des}, A_{s_toe_min}) = 903 \text{ mm}^2/\text{m}$

Reinforcement provided **12 mm dia.bars @ 100 mm centres**

Area of reinforcement provided $A_{s_toe_prov} = 1131 \text{ mm}^2/\text{m}$

PASS - Reinforcement provided at the retaining wall toe is adequate

Check shear resistance at toe

Design shear stress $v_{toe} = V_{toe} / (b \times d_{toe}) = 0.590 \text{ N/mm}^2$
Allowable shear stress $v_{adm} = \min(0.8 \times \sqrt{f_{cu} / 1 \text{ N/mm}^2}, 5) \times 1 \text{ N/mm}^2 = 4.733 \text{ N/mm}^2$

PASS - Design shear stress is less than maximum shear stress

From BS8110:Part 1:1997 – Table 3.8

Design concrete shear stress $v_{c_toe} = 0.534 \text{ N/mm}^2$

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 6	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

WARNING - Shear reinforcement required

Design of reinforced concrete retaining wall stem (BS 8002:1994)

Material properties

Characteristic strength of concrete $f_{cu} = 35 \text{ N/mm}^2$

Characteristic strength of reinforcement $f_y = 500 \text{ N/mm}^2$

Wall details

Minimum area of reinforcement $k = 0.13 \%$

Cover to reinforcement in stem $C_{stem} = 30 \text{ mm}$

Cover to reinforcement in wall $C_{wall} = 30 \text{ mm}$

Factored horizontal at-rest forces on stem

Surcharge $F_{s_sur_f} = \gamma_{f_l} \times K_0 \times \text{Surcharge} \times (h_{eff} - t_{base} - d_{ds}) = 4.2 \text{ kN/m}$

Moist backfill above water table $F_{s_m_a_f} = 0.5 \times \gamma_{f_e} \times K_0 \times \gamma_m \times (h_{eff} - t_{base} - d_{ds} - h_{sat})^2 = 66.9 \text{ kN/m}$

Calculate shear for stem design

Surcharge $V_{s_sur_f} = 5 \times F_{s_sur_f} / 8 = 2.7 \text{ kN/m}$

Moist backfill above water table $V_{s_m_a_f} = F_{s_m_a_f} \times b_l \times ((5 \times L^2) - b_l^2) / (5 \times L^3) = 51.9 \text{ kN/m}$

Total shear for stem design $V_{stem} = V_{s_sur_f} + V_{s_m_a_f} = 54.6 \text{ kN/m}$

Calculate moment for stem design

Surcharge $M_{s_sur} = F_{s_sur_f} \times L / 8 = 1.7 \text{ kNm/m}$

Moist backfill above water table $M_{s_m_a} = F_{s_m_a_f} \times b_l \times ((5 \times L^2) - (3 \times b_l^2)) / (15 \times L^2) = 31.1 \text{ kNm/m}$

Total moment for stem design $M_{stem} = M_{s_sur} + M_{s_m_a} = 32.8 \text{ kNm/m}$

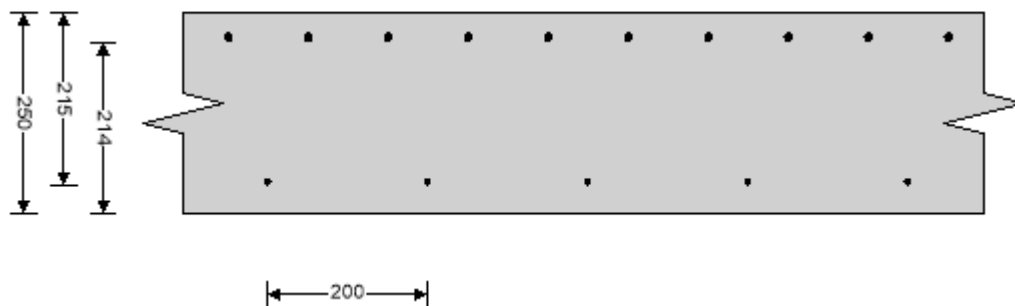
Calculate moment for wall design

Surcharge $M_{w_sur} = 9 \times F_{s_sur_f} \times L / 128 = 0.9 \text{ kNm/m}$

Moist backfill above water table $M_{w_m_a} = F_{s_m_a_f} \times 0.577 \times b_l \times [(b_l^3 + 5 \times a_l \times L^2) / (5 \times L^3) - 0.577^2 / 3] = 13.1 \text{ kNm/m}$

Total moment for wall design $M_{wall} = M_{w_sur} + M_{w_m_a} = 14 \text{ kNm/m}$

←100→



Check wall stem in bending

Width of wall stem $b = 1000 \text{ mm/m}$

Depth of reinforcement $d_{stem} = t_{wall} - C_{stem} - (\phi_{stem} / 2) = 215.0 \text{ mm}$

Constant $K_{stem} = M_{stem} / (b \times d_{stem}^2 \times f_{cu}) = 0.020$

Compression reinforcement is not required

Lever arm $z_{stem} = \min(0.5 + \sqrt{(0.25 - (\min(K_{stem}, 0.225) / 0.9))}, 0.95) \times d_{stem}$

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 7	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

Area of tension reinforcement required
 Minimum area of tension reinforcement
 Area of tension reinforcement required
 Reinforcement provided
 Area of reinforcement provided

$$Z_{stem} = 204 \text{ mm}$$

$$A_{s_stem_des} = M_{stem} / (0.87 \times f_y \times Z_{stem}) = 369 \text{ mm}^2/\text{m}$$

$$A_{s_stem_min} = k \times b \times t_{wall} = 325 \text{ mm}^2/\text{m}$$

$$A_{s_stem_req} = \text{Max}(A_{s_stem_des}, A_{s_stem_min}) = 369 \text{ mm}^2/\text{m}$$

A393 mesh

$$A_{s_stem_prov} = 393 \text{ mm}^2/\text{m}$$

PASS - Reinforcement provided at the retaining wall stem is adequate

Check shear resistance at wall stem

Design shear stress
 Allowable shear stress

$$V_{stem} = V_{stem} / (b \times d_{stem}) = 0.254 \text{ N/mm}^2$$

$$V_{adm} = \min(0.8 \times \sqrt{f_{cu}} / 1 \text{ N/mm}^2, 5) \times 1 \text{ N/mm}^2 = 4.733 \text{ N/mm}^2$$

PASS - Design shear stress is less than maximum shear stress

From BS8110:Part 1:1997 – Table 3.8

Design concrete shear stress

$$V_{c_stem} = 0.468 \text{ N/mm}^2$$

V_{stem} < V_{c_stem} - No shear reinforcement required

Check mid height of wall in bending

Depth of reinforcement
 Constant

$$d_{wall} = t_{wall} - c_{wall} - (\phi_{wall} / 2) = 214.0 \text{ mm}$$

$$K_{wall} = M_{wall} / (b \times d_{wall}^2 \times f_{cu}) = 0.009$$

Compression reinforcement is not required

Lever arm

$$Z_{wall} = \text{Min}(0.5 + \sqrt{(0.25 - (\min(K_{wall}, 0.225) / 0.9))}, 0.95) \times d_{wall}$$

$$Z_{wall} = 203 \text{ mm}$$

Area of tension reinforcement required
 Minimum area of tension reinforcement
 Area of tension reinforcement required
 Reinforcement provided
 Area of reinforcement provided

$$A_{s_wall_des} = M_{wall} / (0.87 \times f_y \times Z_{wall}) = 159 \text{ mm}^2/\text{m}$$

$$A_{s_wall_min} = k \times b \times t_{wall} = 325 \text{ mm}^2/\text{m}$$

$$A_{s_wall_req} = \text{Max}(A_{s_wall_des}, A_{s_wall_min}) = 325 \text{ mm}^2/\text{m}$$

12 mm dia.bars @ 100 mm centres

$$A_{s_wall_prov} = 1131 \text{ mm}^2/\text{m}$$

PASS - Reinforcement provided to the retaining wall at mid height is adequate

Check retaining wall deflection

Basic span/effective depth ratio
 Design service stress
 Modification factor
 Maximum span/effective depth ratio
 Actual span/effective depth ratio

$$\text{ratio}_{bas} = 20$$

$$f_s = 2 \times f_y \times A_{s_stem_req} / (3 \times A_{s_stem_prov}) = 312.9 \text{ N/mm}^2$$

$$\text{factor}_{tens} = \min(0.55 + (477 \text{ N/mm}^2 - f_s) / (120 \times (0.9 \text{ N/mm}^2 + (M_{stem} / (b \times d_{stem}^2)))), 2) = 1.40$$

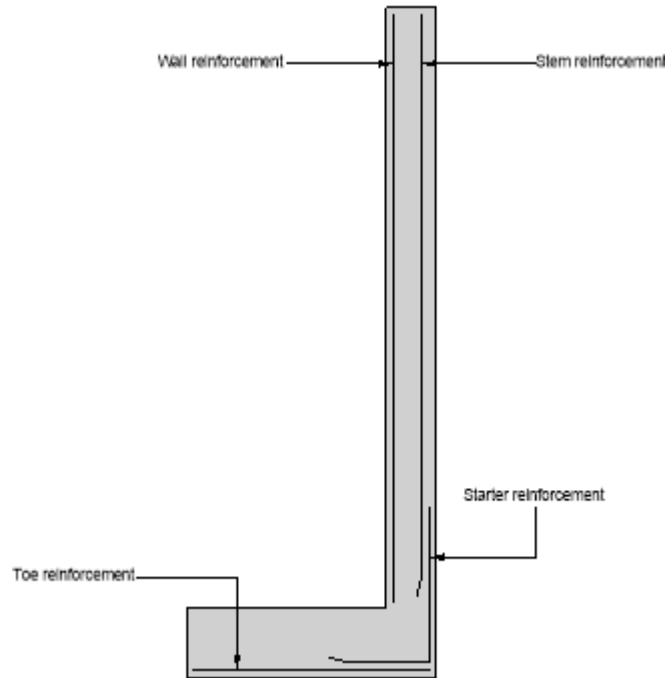
$$\text{ratio}_{max} = \text{ratio}_{bas} \times \text{factor}_{tens} = 28.00$$

$$\text{ratio}_{act} = h_{stem} / d_{stem} = 13.95$$

PASS - Span to depth ratio is acceptable

Project 37 St Catherine's Road, Baglan				Job no. 18910	
Calcs for Retaining wall to the front of the property				Start page no./Revision 8	
Calcs by AS	Calcs date 13/11/2025	Checked by MJ	Checked date 13/11/2025	Approved by MJ	Approved date 13/11/2025

Indicative retaining wall reinforcement diagram



Toe bars - 12 mm dia.@ 100 mm centres - (1131 mm²/m)

Wall bars - 12 mm dia.@ 100 mm centres - (1131 mm²/m)

Stem mesh - A393 - (393 mm²/m)