

REAR 287 → 289. LUTON Rd.
CHATHAM.

LOADING

ROOF
TIMBER FLOOR
BEAM & BLOCK FLOOR
WALL
RC WALL

DL = 1.25 W = 0.75
DL = 0.5 W = 1.5
DL = 1.8 + 2.1 W = 1.5
3.8
6.0

ROOF STRUCTURE

RAFTERS span = 4.9 m.

$$UDL = 0.3 \times 2 = 0.6 \text{ kN/m}$$

$$M_{max} = \frac{0.6 \times 4.9^2}{8} = 1.8 \text{ kNm}$$

$$f_b = \frac{1.8 \times 10^6}{0.33 \times 10^6} = 5.4 \text{ N/mm}^2 < 7.3 \times 1.1$$

$$\delta = \frac{5 \times 0.6 \times 4.9^4 \times 10^{12}}{384 \times 10 \times 10^3 \times 3333 \times 10^6} = 13.5 \text{ mm} < 14.7$$

∴ U/E 50x200 C24 @ 300 c/c

Ridge Beam span = 3.8

$$UDL = 2.0 \times 4.9 = 9.8 \text{ kN/m}$$

$$M_{max} = \frac{9.8 \times 3.8^2}{8} = 17.7 \text{ kNm}$$

$$f_b = \frac{18 \times 10^6}{164 \times 10^3} = 110 \text{ N/mm}^2$$

$$\gamma_f = 1.03 \quad D/t = 22$$

$$\delta = \frac{5 \times 9.8 \times 3.8^4 \times 10^{12}}{384 \times 210 \times 10^3 \times 1250 \times 10^6} = 10.1 \text{ mm} < 13$$

∴ U/E 152x152x23 U/E

$$\text{BEARING STRESS} = \frac{19 \times 1.5}{100 \times 450} = 0.6 \text{ N/mm}^2 < \frac{1.5 \times 3.5}{3.5}$$

∴ U/E 100x450x12 Plate

REAR 287-289 LUTON Rd.
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FIRST FLOOR JOIST span = 3.8m

$$M_{max} = \frac{0.8 \times 3.8^2}{8} = 1.4 \text{ kNm.}$$

$$f_b = \frac{1.4 \times 10^6}{0.333 \times 10^6} = 4.2 \text{ N/mm}^2 < 7.3 \times 1.1$$

$$d = \frac{5 \times 0.8 \times 3.8^4 \times 10^{-12}}{384 \times 10 \times 10^3 \times 333 \times 10^6} = 6.5 \text{ mm} < 11.4$$

∴ UME 50x200 C24 @ 400vc

TBI UDL: $2.0 \times 2.4 / 2 = 2.4$

$$M_{max} = \frac{2.4 \times 3.8^2}{8} = 4.3 \text{ kNm}$$

$$f_b = \frac{4.3 \times 10^6}{3 \times 0.333 \times 10^6} = 4.3 \text{ N/mm}^2 < 7.3 \times 1.1$$

∴ UME 50x200 C24 BOLTED M12 @ 600

BEAM FBI

UDL

$$\text{ROOF} = 1.0 \times 4.9 / 2 = 4.9$$

$$\text{WALL} = 3.8 \times 2.4 = 9.1$$

14 kN/m

$$M_{max} = \frac{14 \times 3.8^2}{8} = 25.3 \text{ kNm.}$$

$$f_b = \frac{25 \times 10^6}{273 \times 10^3} = 92 \text{ N/mm}^2$$

< f_{bc}

$$d_f = 100 \text{ D/F} = 14 \text{ pbc}$$

$$d = \frac{5 \times 14 \times 3.8^4 \times 10^{-12}}{384 \times 210 \times 10^3 \times 2210 \times 10^6} = 8 \text{ mm} < 12.7 \text{ OK.}$$

∴ UME 152x152x37 + 300x6 Btm plate.

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GRAVEL FLOOR.

USE ISO DP BEAM & BLOCK FLOOR.

BEAM GB1	loading	WALL	$3.8 \times 2.8 = 10.6$
		FLOOR	$7.0 \times 2.4/2 = 8.4$
			<u>19 kN/m</u>

$$M_{max} = \frac{19 \times 3.8^2}{8} = 34 \text{ kNm.}$$

$$f_b = \frac{34 \times 10^6}{273 \times 10^3} = 124 \text{ N/mm}^2 < 180$$

$$\sigma = \frac{5 \times 19 \times 3.8^4 \times 10^{12}}{384 \times 210 \times 10^3 \times 220 \times 10^3} = 11.1 < 12.7$$

∴ USE 152x152x37 UC + 300x8 plate ON TOP.

BEAM GB2 span = 3.8.

$$M_{max} = \frac{8.4 \times 3.8^2}{8} = 15.2 \text{ kNm}$$

$$f_b = \frac{15.2 \times 10^6}{164 \times 10^3} = 93 \text{ N/mm}^2 < 180 \therefore \text{OK}$$

$$\sigma = \frac{5 \times 8.4 \times 3.8^4 \times 10^{12}}{384 \times 210 \times 10^3 \times 1230 \times 10^3} = 8.7 < 12.7 \therefore$$

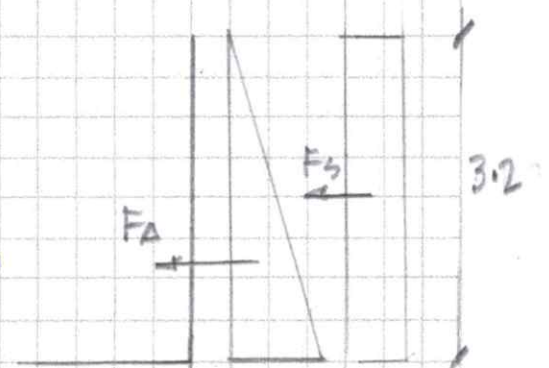
∴ USE 152x152x23 UC

RETAINING WALL

$$F_A = \frac{10 \times 0.3 \times 3.2^2}{2} = 30.7$$

$$F_s = 10 \times 0.3 \times 3.2 = 9.6$$

$$M_{max} = 30.7 \times 1.4 \times 1.1 + 9.6 \times 1.5 \times 1.6 = 47 + 23 = 70 \text{ kNm.}$$



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RETAINING WALL

$$\frac{M}{bd^2} = \frac{70}{1000 \times 202^2} = 1.7$$

$$\frac{100 A_s}{bd} = 0.46 \therefore A_s = \frac{0.46 \times 1000 \times 202}{100} = 929 \text{ mm}^2$$

$\therefore$ USE HIG 200 c/c (1001)

RETAINING WALL TO BE PROPPED IN
TEMPRY CONDITION UNTIL BASEMENT
SLAB CONSTRUCTED.

FOUNDATION UNDER PARTY WALL

LOADING	ROOF	2.0 x 3.8	=	7.6
	WALL	3.8 x 10	=	38
	1ST	2.0 x 3.8	=	7.6
	GROUND	7 x 3.8	=	<u>26.6</u>
				79.8

$$\text{BEARING PRESSURE} = \frac{80}{0.6} = 133 \text{ kN/m}^2 < 150$$

OK

USE 600mm WIDE