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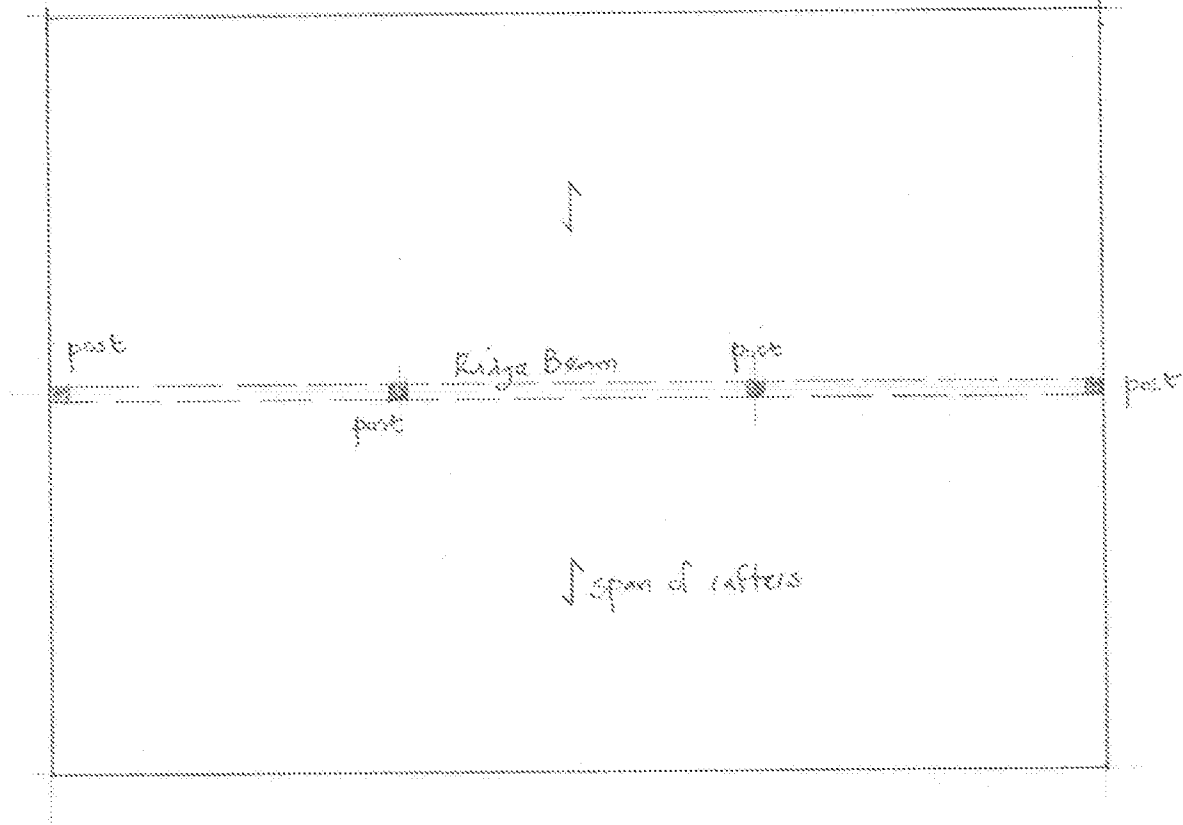
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Sheet 01

Project Maggie's Meadow, Hoe Lane,
Flansham, West Sussex, PO22 8NS

Date May 20

CALCULATIONS



Key Plan Ground Floor showing structure over 1200.

Unit loading

Roof superimposed 0.75 kN/m^2

Slate 0.50 kN/m^2

Rafters 0.13 kN/m^2

Ceiling 0.11 kN/m^2

$$0.75 + 0.14 = 1.52 \text{ kN/m}^2$$

Rafter span 4.9 m

$$W_u = 1.52 \times 4.9 = 4.56 \text{ kN/m}$$

$$Z = \frac{4.56 \times 10^6}{75.175} = 486.6 \times 10^3 \text{ mm}^3/\text{m}$$

To keep deflection to 18 mm

$$\text{minimum } I = \frac{5 \times 1.52 \times 4.9^4 \times 10^{12}}{384 \times 10300 \times 140} = 75.5 \times 10^6 \text{ mm}^4$$

So 1200 @ 400 % provides I of $83.3 \times 10^6 \text{ mm}^4$

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Continuation Sheet No. 02

Provide 50×200 grade C24 rafters @ 400 c/c.

$$\text{Bending stress} = \frac{4.56 \times 10^3 \times 0.4 \times 6}{50 \times 200^3} = 5.5 \text{ N/mm}^2$$

$$\text{Deflection} = \frac{5 \times 1.52 \times 4.9^4 \times 0.4 \times 10^{12}}{384 \times 10800 \times 50 \times 200^3} = 12.7 \text{ mm}$$

Ridge beam Span = 6.7 m

$$\text{Loading roof SW} = 4.9 \times 1.52 = 7.45 \text{ kN/m}$$

$$\frac{0.30}{7.75}$$

$$\text{EM} = \frac{7.75 \times 4.67^2}{8} = 21.13 \text{ kNm}$$

$$\text{T}_{\text{y}} = 178 - 102 \text{ UB} \quad \frac{D}{T} = 22.5 \quad \frac{L}{J} = \frac{467 \times 197}{237} \quad f_{\text{bc}} = 98 \text{ N/mm}^2$$

$$f_{\text{bc}} = \frac{21.13 \times 10^6}{153 \times 10^3} = 138 \text{ N/mm}^2$$

$$\text{T}_{\text{y}} = 203 - 102 \text{ UB} \quad \frac{D}{T} = 21.8 \quad \frac{L}{J} = \frac{467 \times 198}{236} \quad f_{\text{bc}} = 99 \text{ N/mm}^2$$

$$f_{\text{bc}} = \frac{21.13 \times 10^6}{207 \times 10^3} = 102 \text{ N/mm}^2$$

Provide $203 \times 133 \times 25$ UB grade 355

$$\text{Post loads} = 4.67 \times 7.75 = 36.2 \text{ kN} \quad f_c = \frac{36.2 \times 10^3}{153 \times 10^3} = 23.7$$

$$\text{T}_{\text{y}} = 100 \times 100 \times 40 \text{ SXS} \quad \frac{L}{T} = \frac{3925}{291} \times 100 \quad f_{\text{bc}} = 92 \text{ N/mm}^2$$

$$\text{EM} = 36.2 \times 0.1 = 3.62 \text{ kNm} \quad f_{\text{bc}} = \frac{3.62 \times 10^6}{45 \times 10^3} = 77.5 \text{ N/mm}^2$$

$$\frac{E_s + E_{\text{br}}}{f_s + f_{\text{br}}} = \frac{23.7 + 77.5}{92 + 230} = 0.26 + 0.34 = 0.6 \text{ \&}$$

Provide $100 \times 100 \times 4$ SXS grade 355

Foundations post loads carried on 600 central strip footing

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Continuation Sheet No. 03

Ground floor slab 125 concrete reinforced with
A252 mesh

Walls: 50-125 grade C24 Slabs @ 400 c/c

BM $0.45 \text{ kN/m}^2 \times 2.5^2 \div 8 = 0.35 \text{ kN/m}$

bending stress $0.35 \times 10^6 \div 0.4 = 1.08 \text{ N/mm}^2$
50-125 nominal