

1.0 LOADINGS:

1.1 PITCH ROOF:

$$\begin{aligned} \text{TILES} &= 1.00 \} \times 1.40 = 1.75 \\ \text{RES, RAFTERS, RAFTERS} &= 0.25 \} \\ \text{SUPPLIMPOSED} &= 0.30 \times 1.60 = 0.48 \\ \text{ROOF LOAD ON PLAN} &= 1.55 \text{ kN/m}^2 \quad 2.25 \text{ kN/m}^2 \\ \text{LATHE \& PLASTER} &= 0.42 \text{ k} \quad 0.59 \text{ k} \\ &2.00 \text{ "} \quad 2.80 \text{ "} \end{aligned}$$

1.2 CEILING

$$\begin{aligned} \text{JOISTS, LATHE \& PLASTER} &= 0.25 \times 1.40 = 0.50 \\ \text{SUPPLIMPOSED} &= 0.25 \times 1.60 = 0.40 \\ &0.60 \text{ kN/m}^2 \quad 0.90 \text{ kN/m}^2 \end{aligned}$$

2.0 TRUSS DESIGN

2.1 DESIGN RAFTERS:

$$\begin{aligned} \text{TO RS 5268 PART 2} \\ \text{TO SPAN 2.60m ON PLAN} \\ M &= 2.0 \times 0.40 \times 2.60^2 \times 0.25 = 0.68 \text{ kNm} \\ \sigma_{m,2,11} &= 0.68 \times 6 / 47 \times 12^2 = 6.04 \text{ N/mm}^2 \\ \sigma_{m,2dm,11} &= 7.50 \times 1.25 (k_2) \times 1.06 (k_2) \times 1.10 (k_2) = 11.40 \text{ N/mm}^2 \\ S &= \frac{5 \times 2.0 \times 0.40 \times 860^3 \times 12}{384 \times 1080 \times 47 \times 12^3} = 6.50 \text{ mm} \quad \therefore 0.032 = 7.80 \text{ mm} \\ \therefore \text{PROVIDE } 47 \times 125 \text{ C24 RAFTERS @ 400 CENTRES.} \end{aligned}$$

2.2 DESIGN CEILING JOISTS

$$\begin{aligned} \text{TO CANTILEVER 0.90m} \\ \text{LOAD FROM PITCH ROOF} &= 1.55 \times 0.40 \times 1.20 = 0.75 \\ \text{PITCH ROOF} &= 2.00 \times 0.40 \times 1.0 = 0.80 \\ &1.55 \text{ kN} \\ \text{CEILING} &= 0.60 \times 0.40 = 0.25 \text{ kN/m} \\ M &= 1.55 \times 0.90 - 0.25 \times 0.90^2 \times 0.50 = 1.50 \text{ kNm} \\ \sigma_{m,2,11} &= 1.50 \times 6 / 147 \times 145^2 = 9.10 \text{ N/mm}^2 \quad \sigma_{m,2dm,11} = 11.17 \text{ mm} \\ S &= \frac{1.70 \times 0.90^3 \times 12}{13 \times 1080 \times 47 \times 145^3} = 3.20 \text{ mm} \quad \therefore 0.032 \times 2 = 5.40 \text{ mm} \\ \text{AN M12 BOLT CAN SUPPORT 2.23 kN} \\ \therefore \text{PROVIDE } 47 \times 150 \text{ C24 CEILING @ 400 CENTRES} \end{aligned}$$

2.3 DESIGN PARAPETS

$$\begin{aligned} \text{TO SPAN 4.10m} \\ \text{LOAD FROM PITCH ROOF} &= 1.55 \times 1.20 = 1.86 \quad 2.70 \\ \text{PITCH ROOF} &= 2.00 \times 1.00 = 2.00 \quad 2.80 \\ \text{CEILING} &= 0.60 \times 1.20 = 0.72 \quad 1.02 \\ &4.60 \text{ kN/m} \quad 6.60 \text{ kN/m} \\ M &= 4.60 \times 4.10^2 \times 0.25 = 9.30 \text{ kNm} \\ \sigma_{m,2,11} &= 9.30 \times 6 / 200 \times 225^2 = 5.51 \text{ N/mm}^2 \\ \sigma_{m,2dm,11} &= 7.80 \times 1.25 (k_2) \times 1.02 (k_2) = 10.06 \text{ N/mm}^2 \end{aligned}$$

CONTINUED

project: JOLLY'S COTTAGE, LOWER CHUTE, NR. ANKNEY, HAMPS

date: 18th Feb. 26

client: WILMONT BUILDING SERVICES

ref: 27410/CS/H

2.3 CONTINUED

$$S = 5 \times 460 \times 4 \cdot 10^4 \times 12 / 384 \times 7 \cdot 0 \times 200 \times 225^3 = 12 \cdot 74 \text{ mm ACCEPT. } 0 \cdot 03 L = 12 \cdot 30 \text{ mm}$$

$$\sigma_{m,2/11} = 9 \cdot 30 \times 6 / 4 \times 47 \times 135^2 = 7 \cdot 80 \text{ N/mm}^2$$

$$S = 5 \times 460 \times 4 \cdot 10^4 \times 12 / 384 \times 1080 \times 47 \times 135^3 = 13 \cdot 43 \text{ mm ACCEPT}$$

$$\sigma_{m,2/11} = 9 \cdot 30 / 9 = 9 \cdot 60 \text{ N/mm}^2 \quad \sigma_{m,2dm,11} = 12 \cdot 95 \text{ N/mm}^2$$

$$S = 5 \times 460 \times 4 \cdot 10^4 / 384 \times 11 \cdot 56 \times 11 = 13 \cdot 30 \text{ mm ACCEPT}$$

∴ PROVIDE LITRAH 4 200 WIDE X 225 OAK OR DOUGLAS FIR OR 4 NO 47 X 200 C 24 JOINT BOLTED TOGETHER OR A 152 GLULAM BEAM OR A 152 X 89 UB 16 kg/m

3.0 STEEL BEAM DESIGN

TO B.S. 449: PART 2

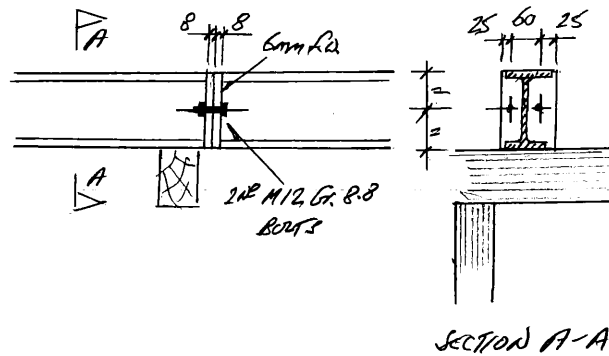
3.1 ALTERNATIVE PURLIN

$$f_{bc} = 9 \cdot 30 / 11 = 85 \text{ N/mm}^2 \quad \sigma_{fy} = 4100 / 21 = 195 \text{ p.k. } 82 \text{ N/mm}^2 \text{ ACCEPT}$$

$$S = 5 \times 460 \times 4 \cdot 10^4 / 384 \times 21 \times 8 \cdot 38 = 362 \text{ mm} \quad \frac{L}{360} = 11 \cdot 39 \text{ mm}$$

∴ THE PURLIN CAN BE 152 X 89 UB 16 kg/m.

3.2 CONNECTION:-



4.0 BEAM BEARINGS:

TO R.E. 562B: PART 1

$$\text{ASSUME } f_k = 280 \text{ N/mm}^2 \quad \gamma_A = 3 \cdot 5 \quad \text{LOCAL DESIGN FACTOR } 1 \cdot 50 \text{ N/mm}^2$$

$$\text{LOCAL DESIGN STRENGTH} = 280 \times 1 \cdot 50 / 3 \cdot 5 = 120 \text{ N/mm}^2$$

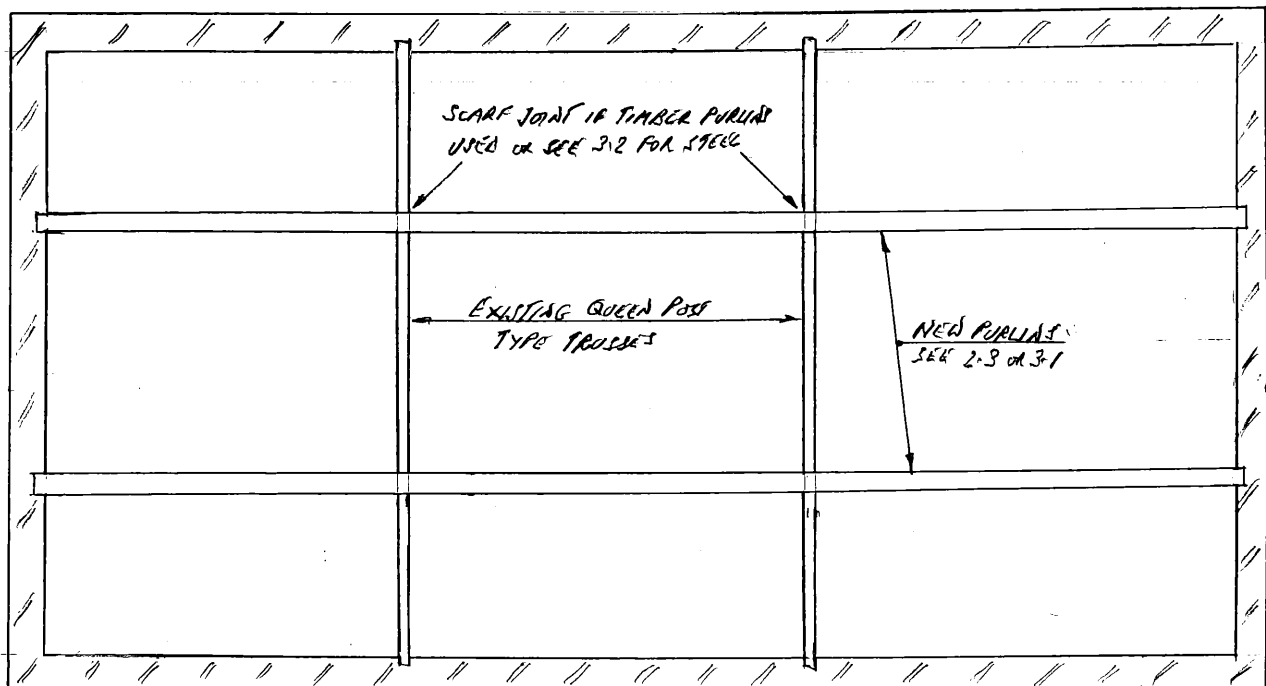
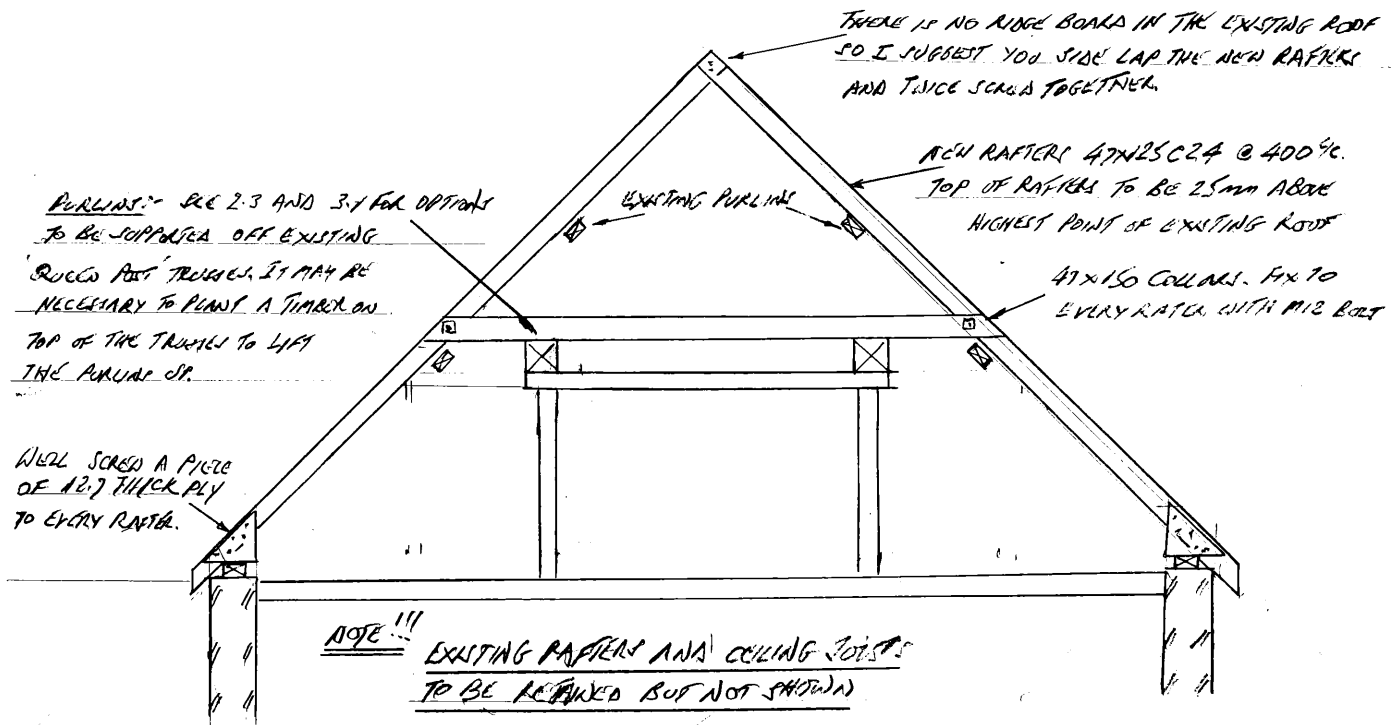
$$\text{MINIMUM BEARING} = 0 \cdot 60 \times 2 \cdot 0 \times 10^3 / 120 \times 100 = 110 \text{ mm}$$

∴ THE TIMBER BEAM WILL SATISFACTORY WITH 100mm BEARINGS

PROVIDE A MINIMUM 150mm LONG OFF CUT OF PRESTRESSED CONCRETE LINTEL UNDER THE STEEL PURLINS.

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		27410 rev:	3 of

5.0 INDICATIVE SECTION



project: JOLLY'S COTTAGE, LOWER CHUTE, HA ANDOVER	date: 20 TH FEB '26
client: WILMONT BUILDING SERVICES	ref: 27410/CE/3