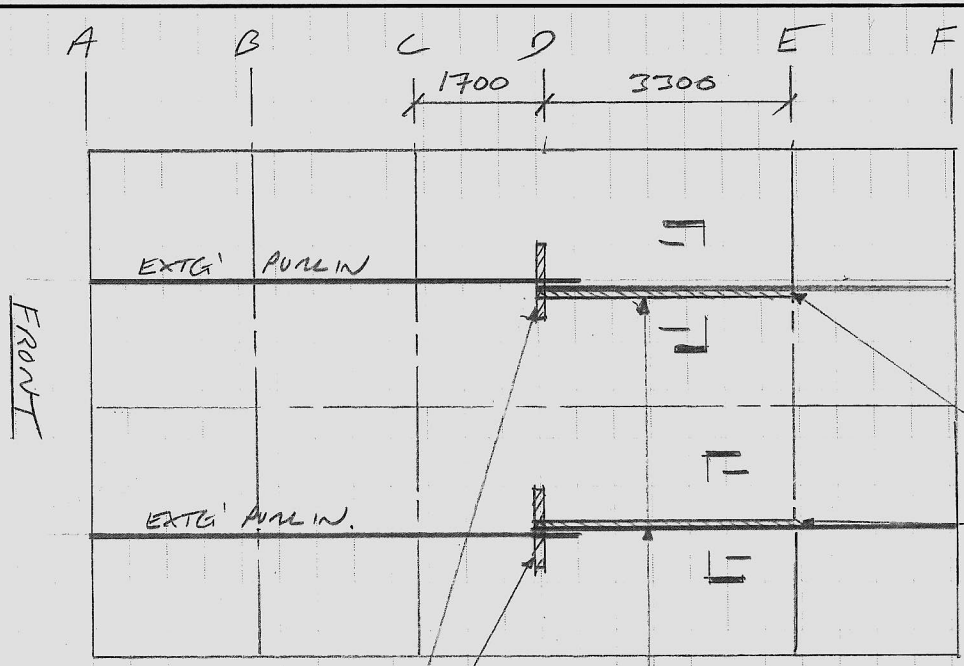
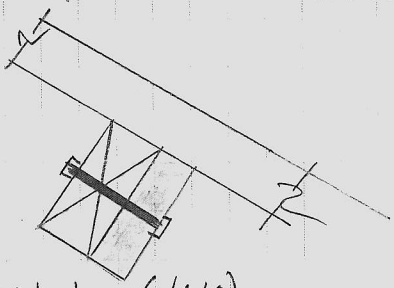


ROOF PLAN (1:100)

PROVIDE 2 M12 BOLTS BETWEEN NEW AND EXTG' PURLINS AT GRID LINE (E)

PROVIDE NEW 175x75mm C16 PURLINS ALONGSIDE EXTG. PURLINS TO BE BOLTED TOGETHER AT 400mm CRS WITH M12 BOLTS

PROVIDE 450x102mm BRICKWORK PIERS BUILT UP OF WALL BELOW TO SUPPORT ENDS OF NEW AND EXISTING PURLINS.



SECTION 1-1 (1:10)

CHECK EXISTING PURLIN.

Design span = 3.3m.

Loading (kN/m)

$$w = 1.7 \times 1.85 = 3.1 \text{ kN/m}$$

$$M_{max} = \frac{3.1 \times 3.3^2}{9} = 3.8 \text{ kNm}$$

existing purlin is 180×50mm timber

$$\therefore Z_{xx} = \frac{50 \times 180^2}{6} = 270 \times 10^3 \text{ mm}^3$$

$$I_{xx} = \frac{50 \times 180^3}{12} = 24.3 \times 10^6 \text{ mm}^4$$

$$\therefore \sigma = \frac{3.8 \times 10^6}{270 \times 10^3} = 14 \text{ N/mm}^2$$

$$\sigma_{all} = 5.3 \times 1.25 = 6.6 \text{ N/mm}^2$$

Try additional 175×50mm C16 purlin

$$\text{combined } Z_{xx} = (270 + 255)10^3 = 525 \times 10^3 \text{ mm}^3$$

$$\sigma = \frac{3.8 \times 10^6}{525 \times 10^3} = 7.2 \text{ N/mm}^2 > 6.6 \text{ N/mm}^2$$

Try additional 175×75mm C16 purlin.

combined $Z_{xx} = (270 + 383)10^3 = 653 \times 10^3 mm^3$

$$\sigma = \frac{3.8 \times 10^6}{653 \times 10^3} = 5.8 N/mm^2 < 6.6 N/mm^2 \text{ (i.o.k.)}$$

combined $I_{xx} = (24.3 + 33.5)10^6 = 57.8 \times 10^6 mm^4$

$$\delta = \frac{5 \times 3.1 \times 3300^4}{384 \times 5800 \times 57.8 \times 10^6} = 14mm$$ ~ considered acceptable due to continuous nature of cont. purlin.

∴ PROVIDE 175×75mm C16 PURLIN ALONGSIDE EXISTING