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Project No: 22062

Sheet No: 01

Date: May '22

By: SP

Project: No. 3 Gravel Hill Cottage

Structural Calculations in connection with Proposed
Alterations to No. 3 Gravel Hill Cottage, Blegrove
Lane, Camerton, Reading.

Loadings:-

Floor Floor:-

Imposed:-

Deck - Board
Joists
Gullies
Ratella

Service

Walls

$$1.55 \text{ k/f}^2 \times 1.6 = 2.48 \text{ k/f}^2$$

$$0.15 \text{ k/f}^2$$

$$0.12 \text{ k/f}^2$$

$$0.05 \text{ k/f}^2$$

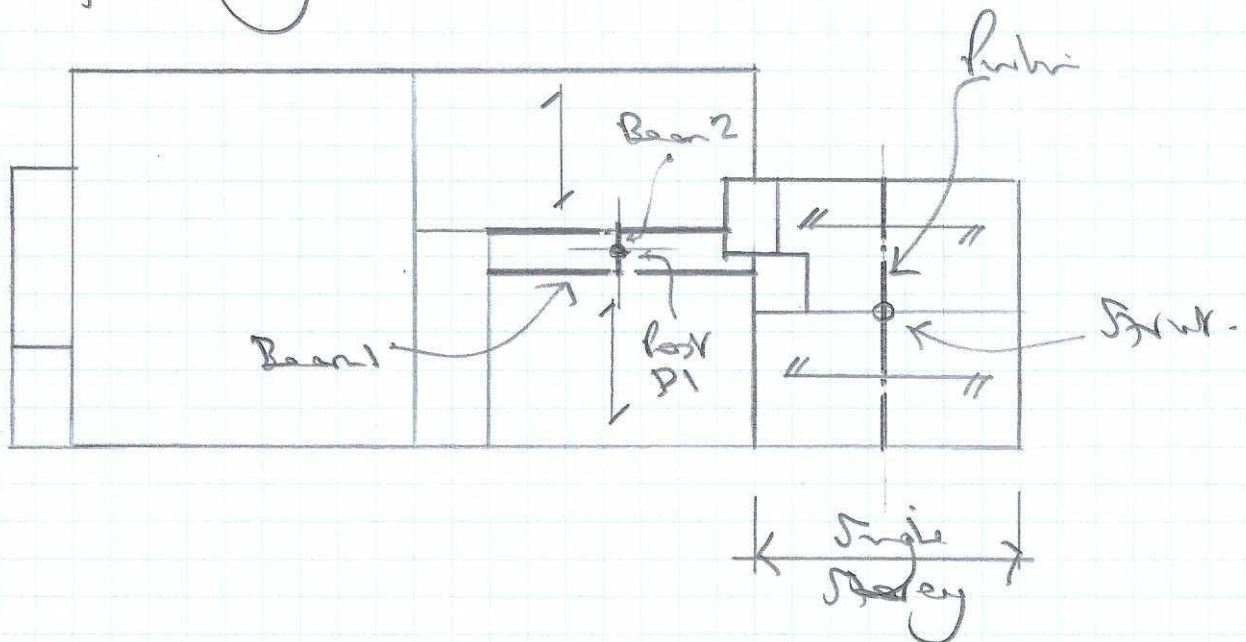
$$0.15 \text{ k/f}^2$$

$$0.47 \text{ k/f}^2 \times 4 = 0.66 \text{ k/f}^2$$

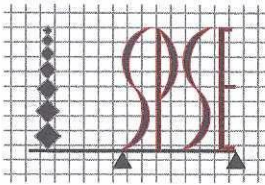
$$1.97 \text{ k/f}^2$$

$$2.06 \text{ k/f}^2$$

Proposed Layout:-



→ Floor Floor Joists
" " Rafter



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Sheet No:

02

Date:

May '22

By:

JP

Project:

N2-3 Gravel Hill Cottage -

Joints:- $\text{Spa} = 2.2m$ $\text{Carks} = 0.45m$ av.

Using 75mm wide oak joints,

$$E_{m, adm, ||} = 7800 \text{ N/m}^2 \times 1.10 \times 1.128 = 968 \text{ N/m}^2$$

$$= B.L = (1.97 \text{ kN/m}^2 \times 0.45m) \times \frac{2.2^2}{8} = 0.54 \text{ kN}$$

$$R = (1.97 \text{ kN/m}^2 \times 0.45m) \times \frac{2.2}{2} = 0.98 \text{ kN}$$

or

$$B.L = (0.98 \text{ kN} \times \frac{2.2m}{4}) + (0.21 \text{ kN} \times \frac{2.2m}{8}) = 0.62 \text{ kN}$$

Using mature oak $E_{m, ||} = 10500 \text{ N/m}^2$

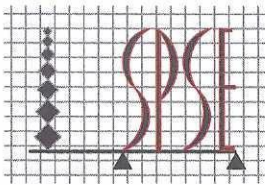
Using 75x75 deep oak joints.

$$E_{m, a, ||} = \frac{0.62 \times 10^6 \times b}{75 \times 75^2} = 882 \text{ N/m}^2$$

$$\Delta = 103 \left[\frac{0.98 \times 10^3 \times 2200^3 \times 12}{48 \times 10500 \times 75 \times 75^3} + \frac{5 \times 0.21 \times 2200^4 \times 12}{204 \times 10500 \times 75 \times 75^3} \right]$$

$$= 9.8 \text{ mm} = 0.045 \text{ L}$$

Note:- Exposed joints = no risk of
cracking plaster based on historic
building = Consider ✓ ok.



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Project No: 22062

Sheet No: 03

Date: May '22

By: [Signature]

Project:

NO. 3 Gravel Hill Cottage.

Beam 1:- $f_{p2} = 1.8m$

Loadings:- Full Floor = $1.97k/m^2 \times \frac{2.6m}{2} = 2.56k/m$

$$B.M = 2.56k/m \times \frac{1.8m^2}{2} = 1.04k$$

$$R = 2.56k/m \times \frac{1.8m}{2} = 2.30k$$

Use 200mm x 125 deep, oak, beam.

$$\sigma_{m,0,11} = \frac{1.04 \times 10^6 \times 6}{200 \times 125^2} = 2.00 N/mm^2 \quad \checkmark_{ok}$$

$$\Delta = 1.05 \left[\frac{5 \times 2.56 \times 1800^4 \times 12}{24 \times (0.8 \times 10500) \times 200 \times 125^3} \right] = 0.0132 \quad \checkmark_{ok}$$

= Use 200 x 125, oak, beam

Beam 2:- $f_{p2} = 0.9m$

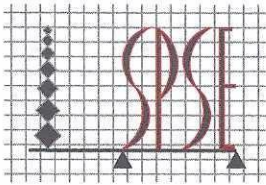
Loadings:- Beam 1:- $2(2.30k) = 4.60k$
Ex Beam:- $2(2.30k) \frac{2.6m}{2.6m} = 4.60k$
9.20k

$$B.M = 4.60k \times \frac{0.9m}{2} = 0.99k$$

Use 150 x 150, oak, beam

$$\sigma_{m,0,11} = \frac{0.99 \times 10^6 \times 6}{150 \times 150^2} = 1.78 N/mm^2 \quad \checkmark_{ok}$$

= Use 150 x 150, oak, beam.



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Project No:

22062

Sheet No:

07

Date:

May '22

By:

SP-

Project:

Nº-3 Colwell Hill Cottage.

Per P1:-

Loadings:-

Bear area:-

= 9.35k

By inspection, Use 150x150, oak, post.

Rafter:-

$$S_p = \frac{1.7m}{\cos 17.2^\circ} = \underline{1.8m}$$

By inspection,

check existing rafter are
100x50, c24, @ 400mm c/c.

Purlin:-

$$S_p = \underline{1.8m}$$

Loadings:-

$$\text{Raked Roof} = 1.50 \text{ kJ/m}^2 \times 1.7 \text{ m}^2 = 2.55 \text{ kJ}$$

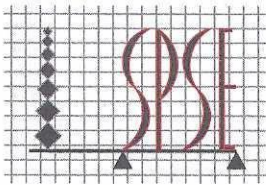
$$= B.M. = 2.55 \text{ kJ} \times \frac{1.8^2}{8} = \underline{1.03 \text{ kNm}}$$

$$r = 2.55 \text{ kJ} \times \frac{1.8}{2} = \underline{2.29 \text{ kNm}}$$

Use 150x50, c24, timber

$$\sigma_{m, a, II} = \frac{1.03 \times 10^6 \times 6}{50 \times 150^2} = \underline{5.49 \text{ N/mm}^2}$$

= Use 150x50, c24, purlin.



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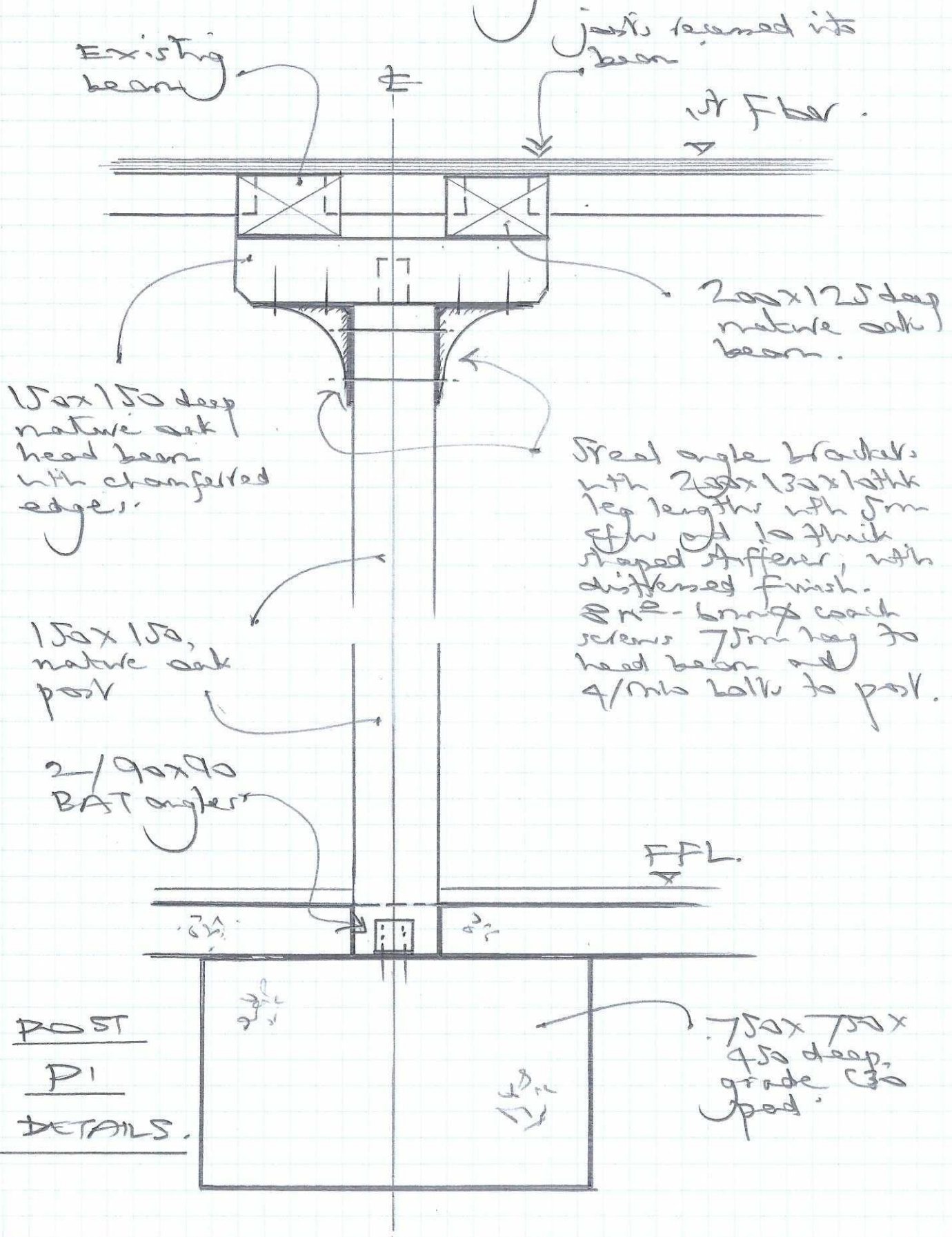
Project No: 22062

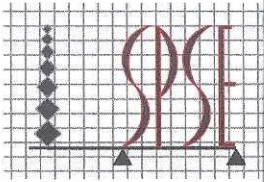
Sheet No: 05

Date: May '22

By: J.P.

Project: No. 3 Glavel Hill Cottage





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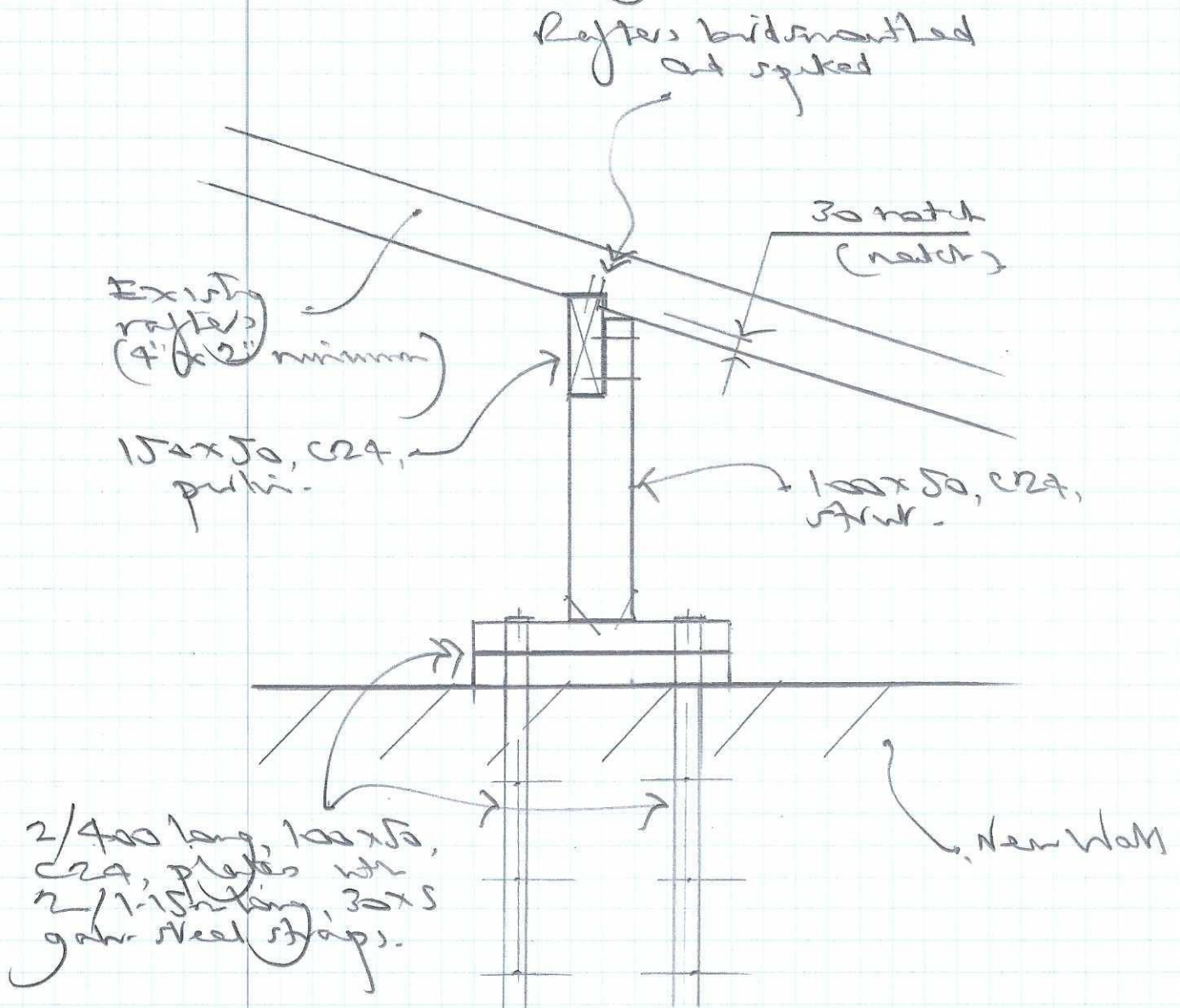
Project No: 22062

Sheet No: 06

Date: May '22

By: JH.

Project: N°-3 Gravel Hill Cottage -



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