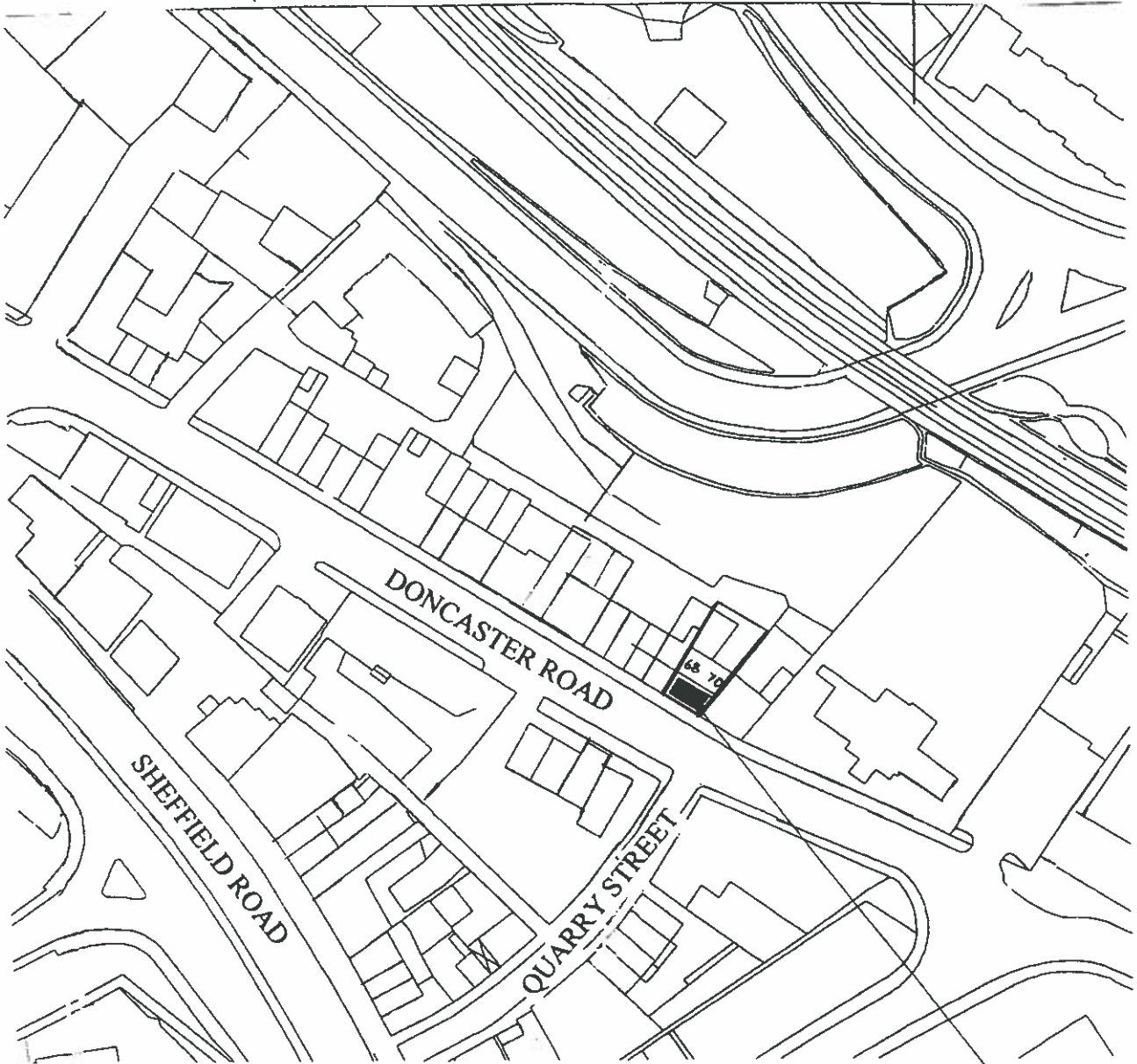


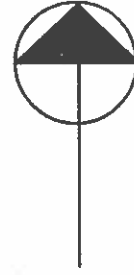
NORTH



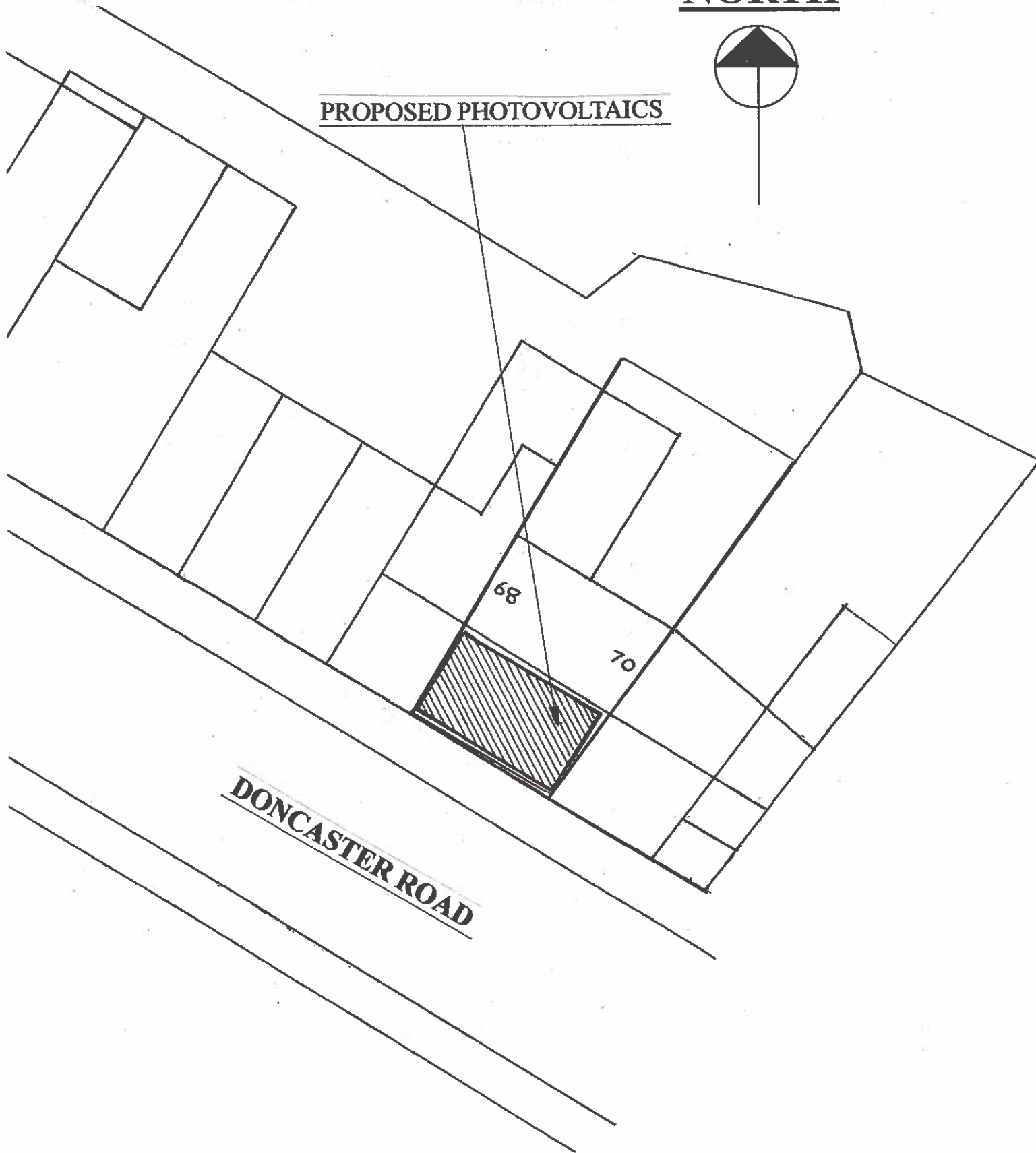
PROPOSED PHOTOVOLTAICS

LOCATION PLAN SCALE 1:1250

NORTH



PROPOSED PHOTOVOLTAICS



DONCASTER ROAD

BLOCK PLAN SCALE 1:250



15 Hotels in Bamsley - www.laterooms.com/Bamsley-Hotels - 4* from £50. Limited Availability. All hotels shown on a strict

EXISTING TIMBER PURLIN CHECK AT BURGESS HOUSE
68 & 70 DONCASTER ROAD BARNSELY

Purlin Span = 4.15m

Size of timber purlin = 225 x 75mm

Effective span between centre of bearing 4.25m

Stress grade of timber C24

Two purlins between Ridge and Eaves

Span between centres of purlins including ridge & eaves = 1975mm

Dead Load on Purlin

Roof slates = 53kg/m²

Tile laths and rafter over the area = 10kg/m²

Photovoltaic = 12kg/m²

Total = 75kg/m² = 0.74KN/m²

Live load on Purlin = 1.0KN/m²

$$4.15\text{m} \times 1.975\text{m} \times \cos 30 \text{ degrees} \times 1.74\text{KN/m}^2 = 12.35\text{KN}$$

Total load on beam = 12.35KN

$$M_{bm} = \frac{WL}{8} = \frac{12.35 \times 4.25}{8} = \underline{\underline{6.56\text{KNm}}}$$

From table 8 Grade stress bending for SC4 Grade timber = 7.50N/mm²

Apply factor K3 for duration load = 1.25

Apply depth factor K7 = 1

Estimated Permissible Bending Stress = f

$$f = 7.50 \times 1.25 \times 1 = 9.38\text{N/mm}^2$$

$$Z \text{ Required} = \frac{M_{bm}}{f} = \frac{6.56 \times 10^6}{9.38} = \frac{6560000}{9.38} = \underline{\underline{699360.34 \text{ mm}^3}}$$

Permanent Deflection = D = 0.003 x 4150mm = 12.45mm

Modulus of Elasticity = E = 6600N/mm

$$I \text{ Required} = \frac{5 \times W \times L}{384 \times E \times D} = \frac{5 \times 12.35 \times 415^3 \times 10^6}{384 \times 6600 \times 12.45} = \frac{10634893 \times 415}{31553280}$$

$$= 139.87 \times 10^6 = \underline{\underline{139870000\text{mm}^4}}$$

Existing 225 x 75mm SC4 Timber Section

$$Z \text{ Provided} = \underline{633000\text{mm}^3}$$

$$I \text{ Provided} = \underline{71200000\text{mm}^4}$$

Therefore Section not adequate.

Propose new 225 x 75 mm SC4 purlins fixed to side of existing purlins by bolting together at 600mm centres and letting into party wall positions.

$$\text{Total } Z \text{ provided} = 633000\text{mm}^3 + 633000\text{mm}^3 = \underline{1266000\text{mm}^3}$$

$$\text{Total } I \text{ provided} = 71200000\text{mm}^4 + 71200000\text{mm}^4 = \underline{142400000\text{mm}^4}$$

Therefore now satisfactory

Check Shear

$$\text{Shear Stress} = \frac{1.5V}{bd} \text{ N/mm}^2 \quad b = 100\text{mm} \quad d = 150\text{mm}$$
$$V = \frac{12.35}{2} = 6.18\text{KN}$$

$$\text{Therefore shear stress} = \frac{1.5 \times 6.18 \times 10^3}{225 \times 150} = \frac{9270}{33750} = \underline{0.275\text{N/mm}^2}$$

$$\underline{\text{Grade shear stress of timber} = 0.71\text{N/mm}^2}$$

$$\begin{aligned} \text{Permissible Shear Stress} &= \text{Grade Shear Stress} \times K3 \\ &= 0.71 \times 1.25 = \underline{0.89\text{N/mm}^2} \end{aligned}$$

Therefore Satisfactory in Shear

$$\text{Shape Depth Ratio } \frac{h}{b} \leq 4 \text{ as table 17 therefore } \frac{225}{150} = 1.5$$

$$1.5 \leq 4 \quad \underline{\text{Therefore satisfactory}}$$

225mm x 75mm SW C24 timber purlin addition satisfactory