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Date 27/3/17 | JOB No 7139

Eng. AG

Job. FLAT 4
17 PRINCE ALBERT RD
LONDON NW1

DRAWING / CALCULATION ISSUE SHEET

Issued to HILARY CHARLEWOOD

Documents	Copies
DRAWINGS Nos 7139/SK1 - SK2	
CALCULATION SHEETS Nos 7139/1-3	

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Date 3/17	Sheet No. 7139/SK1
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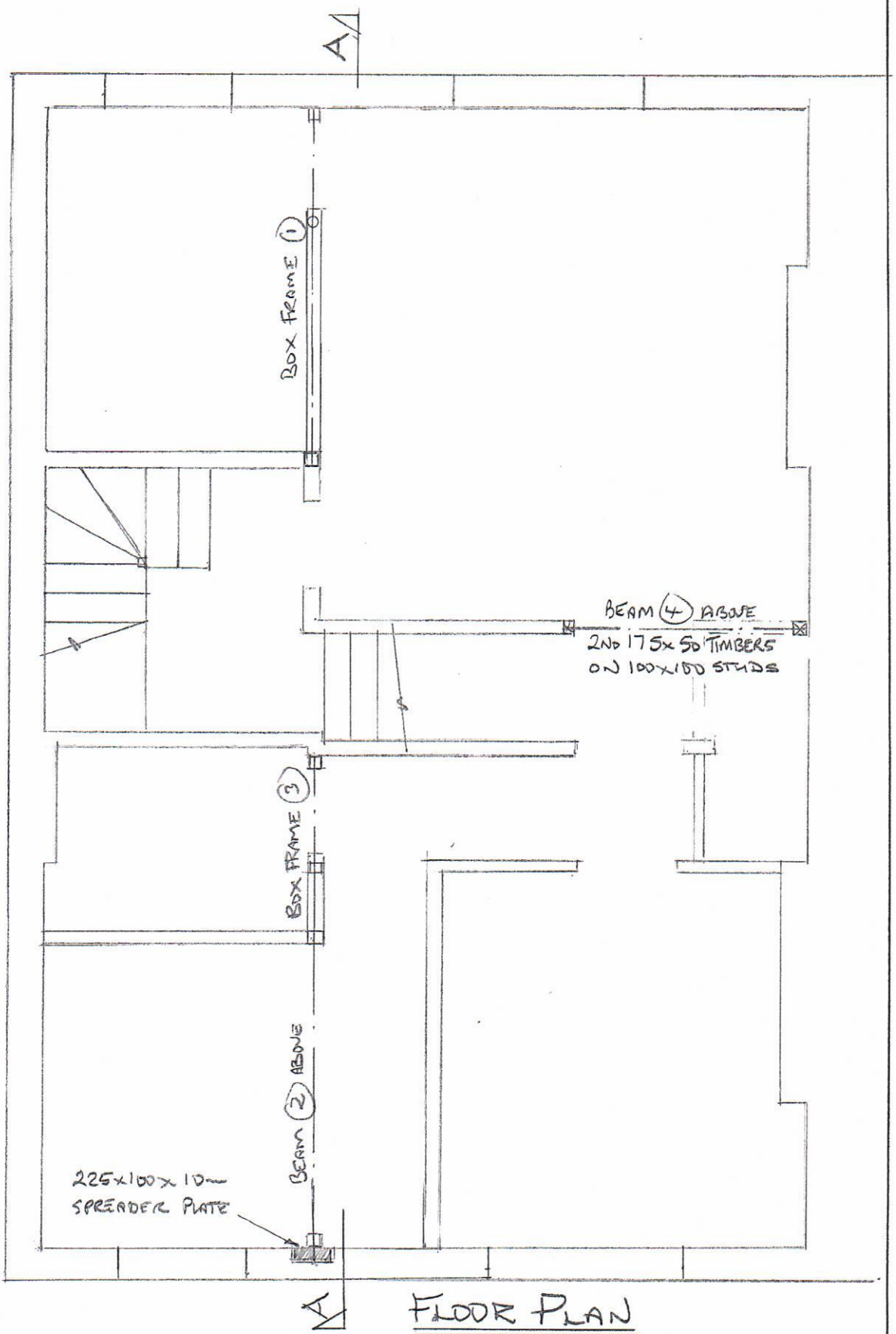
Job. FLAT 4 17 PRINCE ALBERT ROAD LONDON NW1	



FLOOR PLAN

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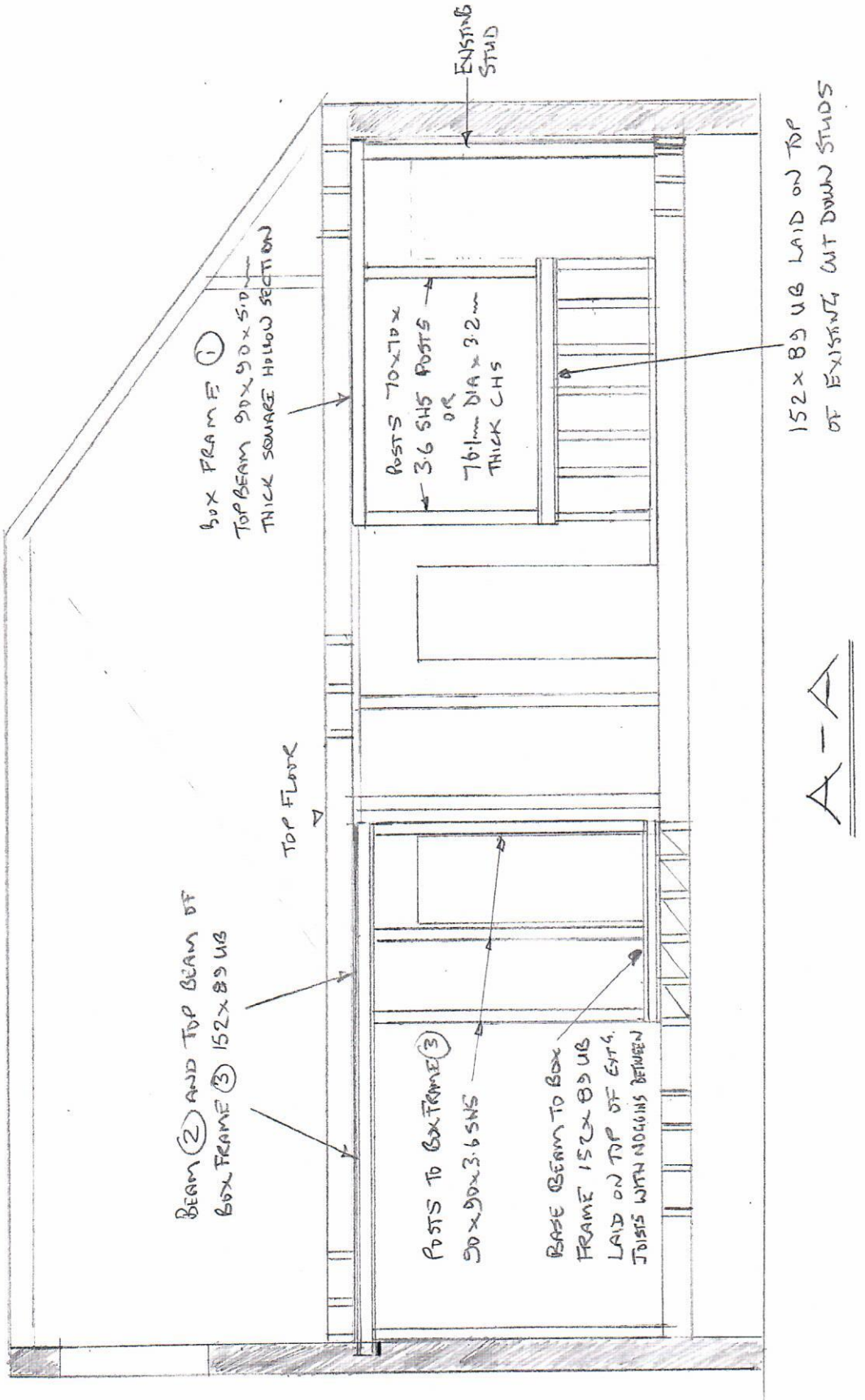

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STRUCTURAL DESIGN FOR PROPOSED ALTERATIONS

TO BE READ IN CONJUNCTION WITH DRAWINGS NOS 7139/SK1 - SK2

UNIT LOADS

ROOF DL+IL = 1.6 KN/m² PLAN

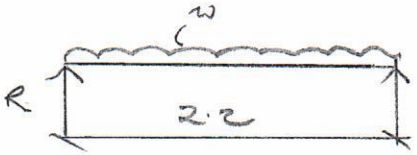
TIMBER FLOOR DL+IL = 2.0 KN/m²

STUD PARTITION = 0.5 KN/m² ELEV.

BOX FRAME (1)

WE WILL USE A BOX FRAME TO SPREADER THE LOAD FROM ABOVE BACK TO THE EXISTING STUDS

TOP BEAM LOADING



W: ATTIC FLOOR. ALLOW 2.0 × 6.5 × 0.5 = 6.5 KN/m

PARTN ALLOW 0.5 × 2.4 = 1.2

7.7 KN/m

R = 8.5 KN

BENDING $M = 7.7 \times 2.2^2/8 = 4.7$ KNm

FOR 90 × 90 × 5.0 SHS, $f_{bc} = \frac{4.7 \times 10^6}{45.0 \times 10^3} = 104$ N/mm² < p_{bc}

DEFLECTION. TOTAL $\delta = \frac{5}{384} \times \frac{7.7 \times 2.2^4 \times 10^{12}}{21 \times 10^4 \times 202 \times 10^4} = 5.5$ mm

$= \frac{1}{400}$

BEAM 90 × 90 × 5.0 SHS

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POSTS 70x70x3.6 SHS OR 76.1x3.2mm THICK CHS

BOTTOM BEAM 152x89 UB

POSTS $R = 8.5$ KN. FOR 70x70x3.6 SHS, $f_c = \frac{8.5 \times 10^3}{9.5 \times 10^2}$

$= 9$ N/mm² $< p_c$

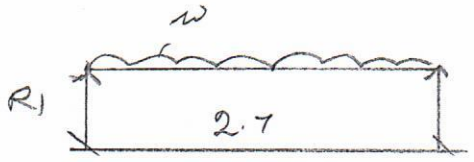
OR 76.1x3.2 CHS, $f_c = 12$ N/mm² $< p_c$

BOTTOM BEAM BY INSPECTION 152x89 UB

NOTE: IF SOME ROOF LOAD IS TRANSFERED TO THE BOX FRAME, THE ELEMENTS HAVE PLENTY OF ADDITIONAL CAPACITY

BEAM (2)

LOADING



w. ALLOW AS BOX FRAME (1) = 7.7 KN/m

$R1 = 10.4$ KN.

BENDING $M = 7.7 \times \frac{2.7^2}{8} = 7.0$ KNm

FOR 152x89 UB, $f_{bc} = \frac{7.0 \times 10^6}{110 \times 10^3} = 64$ N/mm²

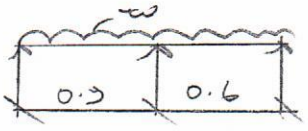
DEFLECTION, TOTAL $\delta = 3.1$ mm

152x89 UB

BOX FRAME (3)

WE WILL USE A BOX FRAME, WITHIN THE BATHROOM PARTITION, TO SPREAD THE LOADS ONTO THE PARTITION BELOW, ASSUMING THAT THE FRAME IS STIFF ENOUGH TO SPREAD THE LOAD FROM BEAM (2) OVER ITS LENGTH

LOADING



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Date 3/17	Sheet No. 7139/3
Eng. MG	
Job. FLAT 4, 17 PRINCE ALBERT ROAD, LONDON NW1	

W. AS BEAM (2) = 7.7 KN/m

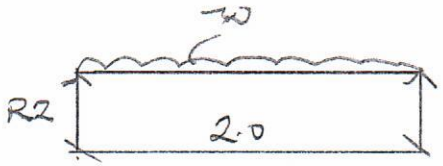
BEAM (2) LOAD = 10.4/1.5 = 6.9/14.6 KN/m

BY INSPECTION TOP + BOTTOM BEAMS 152 x 89 UB
POSTS 90 x 90 x 3.6 SHS.

BEAMS 152 x 89 UBs AND POSTS 90x90 x3.6 SHS

BEAM (4)

LOADING



W PART^N 0.5 x 1.0 = 0.5 KN/m

ROOF ALLOW 1.6 x 3.4 x 0.5 = 2.7/3.2 KN/m

R2 = 3.2 KN

BENDING $M = 3.2 \times 2.0^2/8 = 1.6$ KNm

FOR 2No 175 x 50 TIMBERS, $\sigma = \frac{1.6 \times 10^6}{2 \times 50 \times 170^2/6} = 3.3$ N/mm²

DEFLECTION TOTAL $\delta = \frac{5}{384} \times \frac{3.2 \times 2.0^4 \times 10^2}{5800 \times 1.14 \times \frac{2 \times 50 \times 170^3}{12}} = 2.3$ mm

2No 175 x 50 TIMBERS ON 100x100 TIMBER STUDS