

JOB TITLE Castle Inn, Hickstead			ITEM Structural calculations		
DESIGNED BY GM	DATE Apr 25	CHECKED BY	JOB NO. 24283	SHEET 09	REV

CELLAR STRENGTHENING

BEAM 1-5

DESIGN SPAN = 4m

FLOOR LOAD = 4.7 kN/m²

UDL = $4.7 \times 2.6 = 6.1 \text{ kN/m}$

SW = 0.3 kN/m

} 6.4 kN/m

BM = $\frac{6.4 \times 4^2}{8} = 12.8 \text{ kNm}$ - x/f = 20 kNm

I_{req} = $\frac{5 \times 6.4 \times 4000^3 \times 360}{384 \times 205 \times 10^3} = 937 \times 10^4 \text{ mm}^4$

6-5-2 PROVIDE 203 x 133 x 25 UB M_B = 28 kNm

I_{pro} = 2340 x 10⁴ mm⁴

EXISTING BEAMS

9" x 4" RST

13 FOOT SPAN SWL = 7.4 T

W = 6.4 x 4 = 25 kN = 2.56 tonnes < 7.4

I_{pro} = 8/13 in⁴ → 3377 x 10⁴ mm⁴ >> 937

EXISTING BEAMS = SAFE

JOISTS

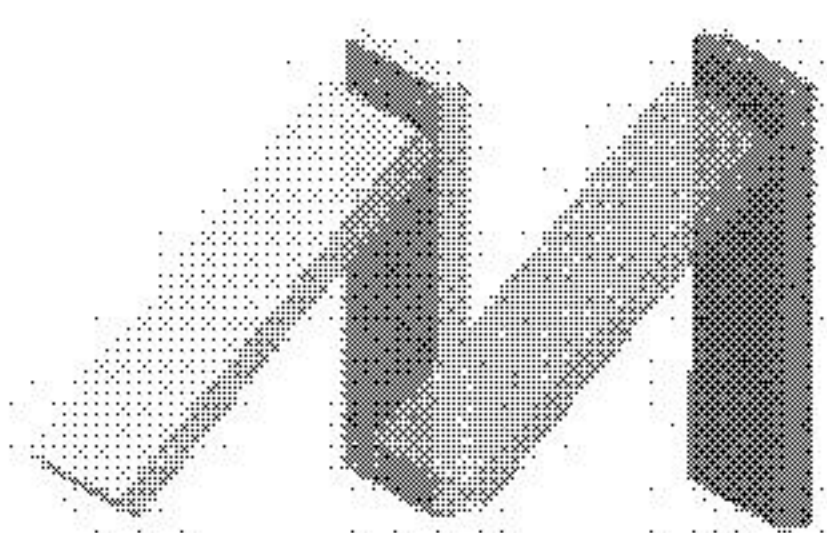
50 x 125 1.3m SPAN

UDL = 4.7 x 0.4 = 1.9 kN/m

BM = $1.9 \times 1.3^2 / 8 = 0.4 \text{ kNm}$

$\frac{f}{t} = \frac{0.4 \times 10^6 \times 6}{50 \times 125^2} = 3 \text{ N/mm}^2$ SAFE

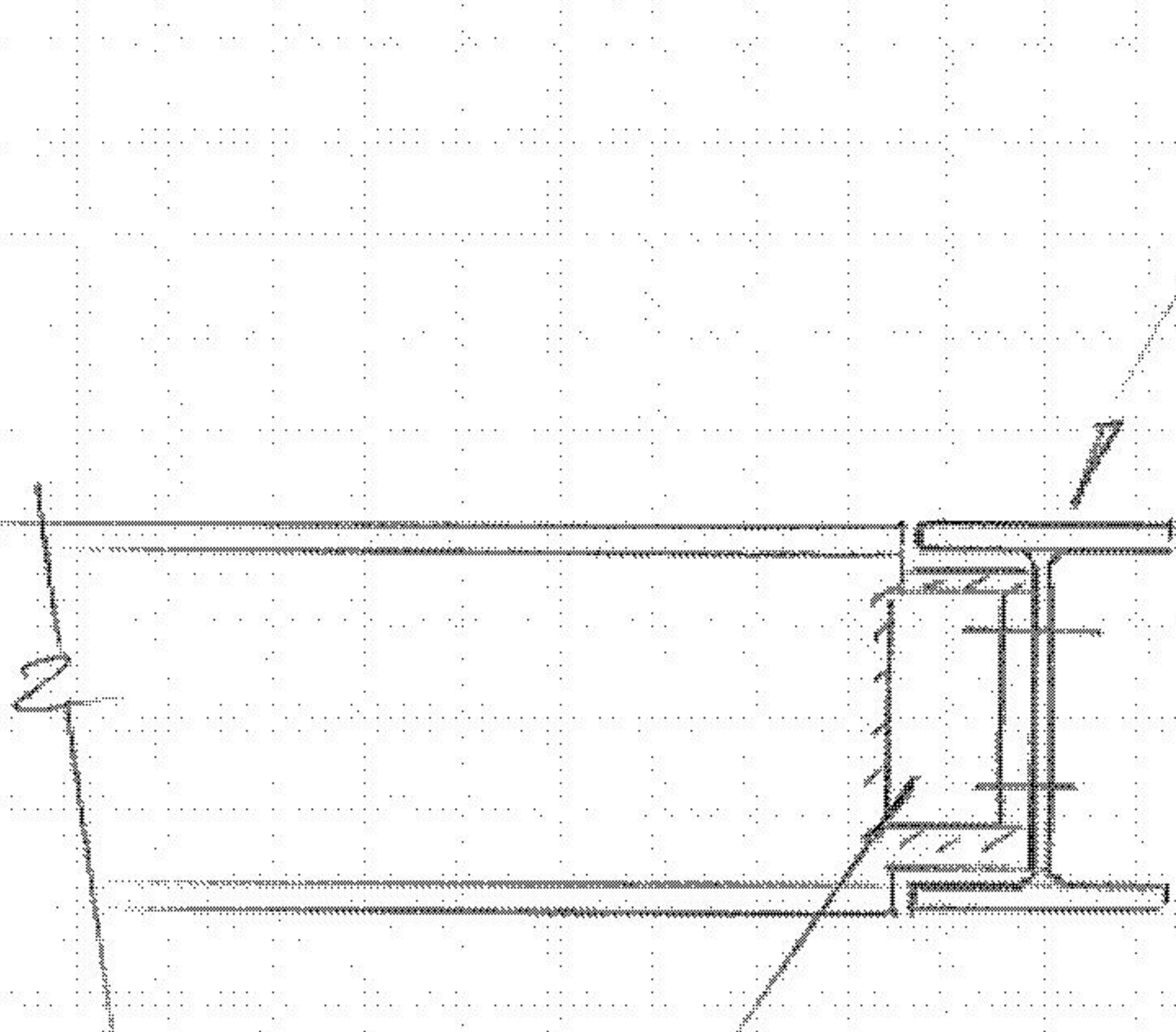
$d = \frac{5 \times 1.9 \times 1300^4 \times 12}{384 \times 10800 \times 50 \times 125^3} = 0.8 \text{ mm}$ SAFE



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BEAM 6
4.2m DESIGN SPAN
FLOOR LOAD - $3.2 \times 4.7 = 7.5 \text{ kN/m}$
SW - 0.3 kN/m } 7.8 kN/m
EM - $7.8 \times \frac{4.2^2}{8} = 17 \text{ kN}$ x $\gamma_f = 27 \text{ kN}$
I_{req} = $1321 \times 10^4 \text{ mm}^4$
6-55. PROVIDE 203 X 133 X 30 UB . $M = 43 \text{ kNm}$

BEAM 7
2.5m DESIGN SPAN SW - 0.3 kN/m
FLOOR LOAD - $8.2 \times 6.7 = 19.3 \text{ kN/m}$ } 19.6
EM - $19.6 \times \frac{2.5^2}{8} = 15.3$ x $\gamma_f = 24 \text{ kNm}$. $M = 41.5$
6-3 PROVIDE 203 X 133 X 25 UB



ANGLE CLIP
OR PLATE
END PLATE
+ 4N° M12/M16
BOLTS

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BEAM
8

12m DESIGN SPAN $sw = 0.36k$

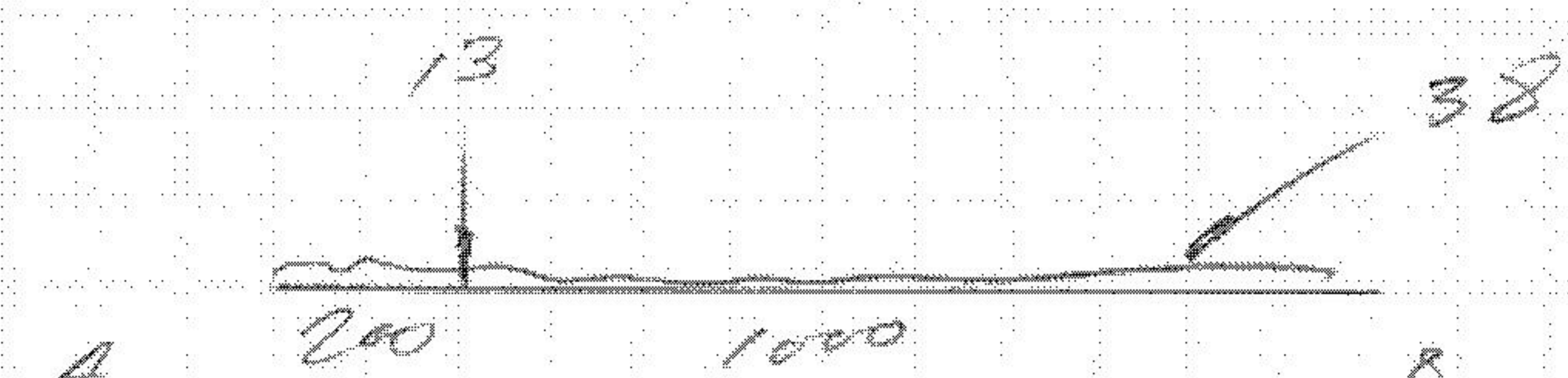
ROOF LOAD $= \frac{4.6}{2} \times 1.6 =$

WALL $= 6m \times 5 = 30k$

FLOOR $= \frac{4.6}{2} \times 2.5 = 5.8k$

TOTAL $= 38k$

POINT LOAD $R_4 = 6.4 \times 4/2 = 13k$



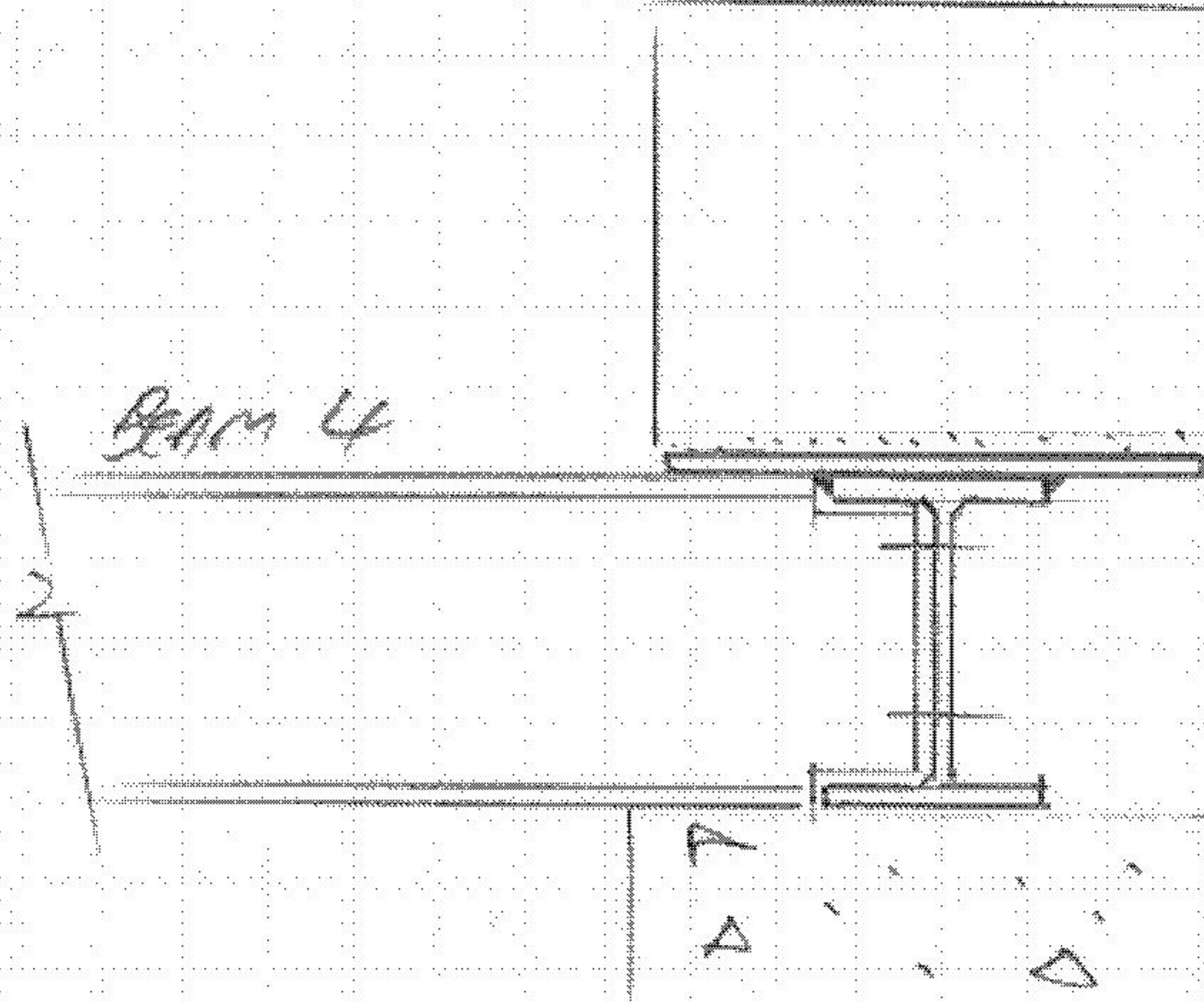
$R_A = \frac{1}{1.2} \left(\frac{38 \times 1.2^2}{2} + 13 \times 1 \right) = 33.6k$
 $R_B = 25k$

$x = 25/38 = 0.66m$

$BM = 25 \times 0.66 - \frac{38 \times 0.66^2}{2} = 8.2k$

$\times 12k = 12k$

Provide 203x133x25 UB



PADSTONE $A = 33.6 \times 10^3 \times 1.457 \times 3.5$

3.5×1.5

$= 32480 mm^2$

FULL WIDTH INSIDE CONCRETE PADSTONE

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OTHER PADSTONES

ALL 330mm CONG

CONC. PADS

