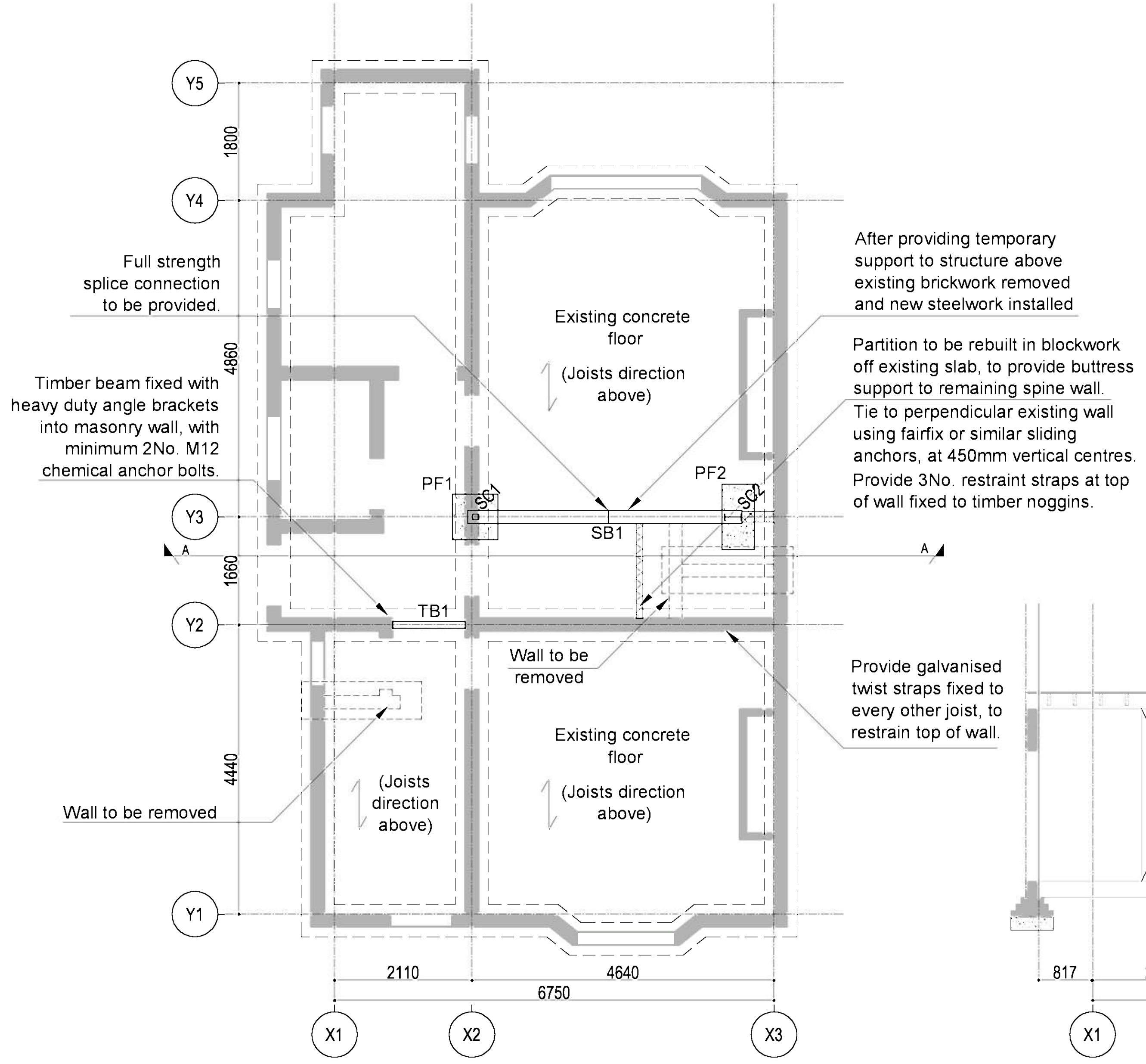
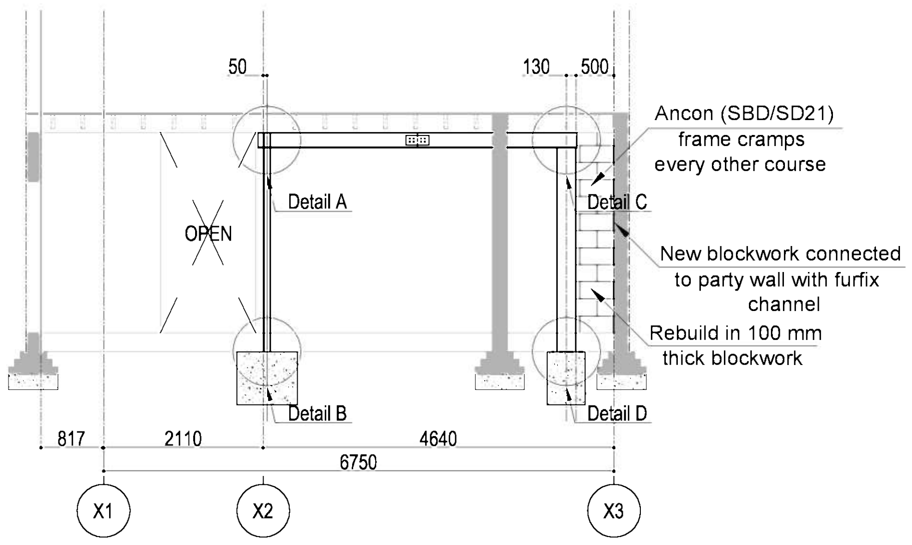
NOTE:

Contractor to confirm that joist spans are coninuous over the supporting walls which are to be removed, prior to their removal.



Ground Floor Plan



Section A-A Basement

GENERAL NOTES
1.All dimensions to be confirmed on site before starting construction
2. Do not scale from this drawing.

STEELWORK NOTES
1.All steel work to be shot blasted to SA2.5, and primed with 75 primer before despatch from works and to be touched up on site where necessary after erection.
2.All steelwork section to comply with BS EN 10025 or BS EN 10210 grade S275. Tubular sections to be Celsius 355 to comply with BS EN 10210:S355J2H
3.Steelwork adjacent to or within cavity to be painted with bituminous paint. External steelwork to be hot-dip galvanized to 120 microns film thickness.
4.Bolts to be grade 8.8 generally. Bolts for splice detail to be HSFG bolts.

MASONRY NOTES

1.External and internal blockwork to be Thermalite Shield 3.6N/mm² blocks. Blockwork below DPC to be 7N/mm²
2. All mortar joints to be 3mm joint building system
3.Provide Ancon SDB/SD21 frame cramps fixed to column/masonry at 450 c/c vertically

TIMBER NOTES

TB1
100 x 100 C24

CONCRETE NOTES
1. Concrete mix for slab to be GEN3.
2. Concrete Grade for foundations to be RC28/35.
3. Foundations to be cast on naturally occurring clay strata with an allowable bearing capacity of 100 kN/m² , minimum 1m below GL.
4. Formation level to be approved by Building Inspector.
5. Concrete to be cured for 7 days after placing. Loads must not be applied until the concrete has achieved sufficient strength.
6. Cover to reinforcement to be 50mm unless stated otherwise.
7. Reinforcement to have minimum 400mm end and side laps.
8. All reinforcement to be supported on suitable spacers or chairs to achieve cover and maintain position during concreting.
9. Where slab is cast against masonry, 10mm movement joint is to be provided (MJ).

STEELWORK LIST
SB1
UB 203 x 133 x 30
SC1
SHS 90 x 90 x 5
SC2
UC 254 x 102 x 28

RC foundation List (Grade Gen 3)
PF1
700x700x1000 deep reinforced concrete pad foundation reinforcemed with A393 mesh top and botton

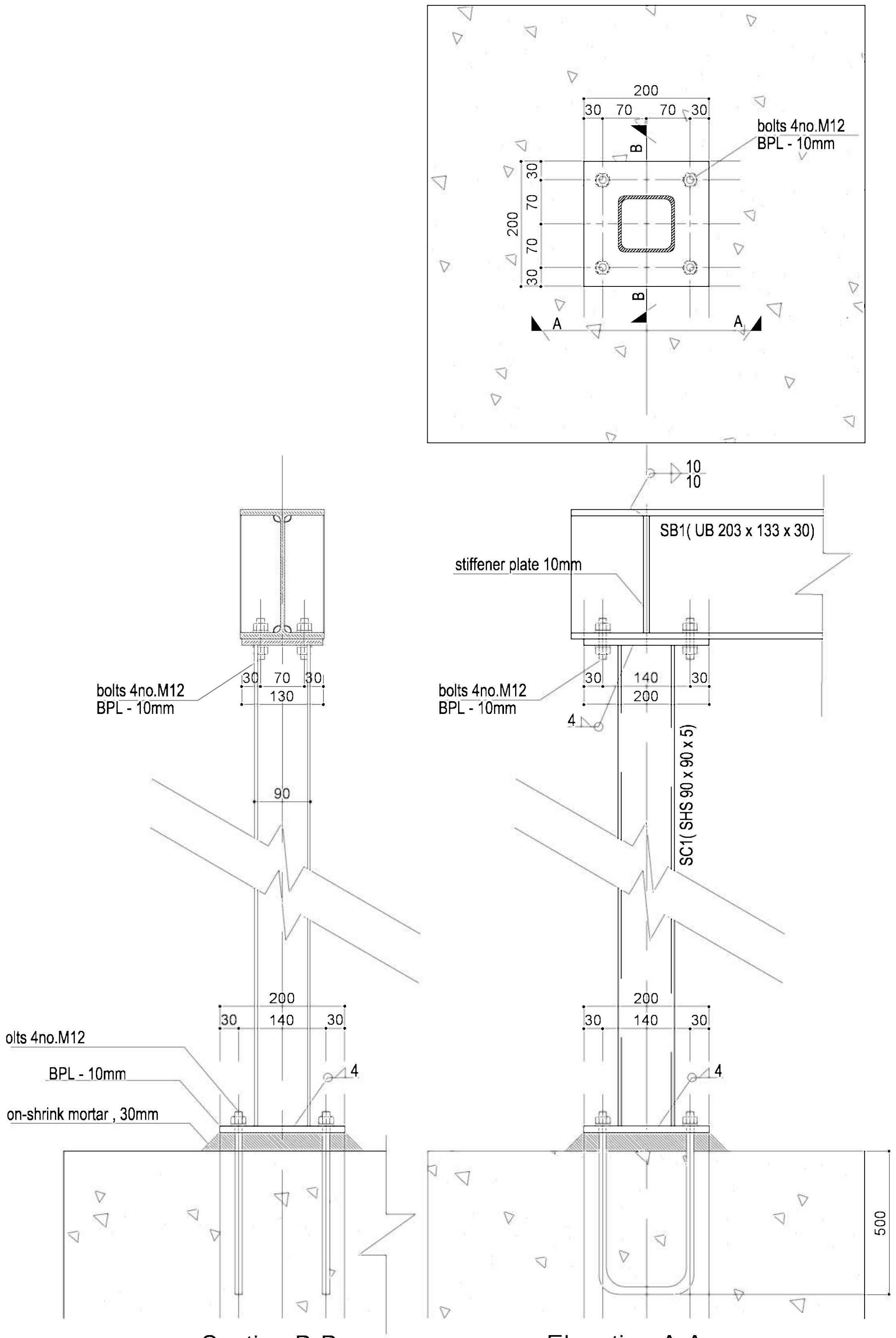
PF2
500x1000x1000 deep reinforced concrete pad foundation reinforcemed with A393 mesh top and botton

Existing wall construction
Existing foundation
Proposed pad foundation
Proposed blockwork 100 mm thick

structured environment
consulting structural and civil engineers
3F 2-4 Exmoor Street London W10 6BD
tel : 020-8206-6215 / fax : 020-8206-6201
info@structured-environment.com

Address	Project Title	Drawing Title	SE Ref	Scale @A3	Drawing number
Garden Flat 96 Haverstock Hill, London NW3 2BD	Internal structural alterations	Proposed plans	11055	S=1/100 date 15.06.11	S-01

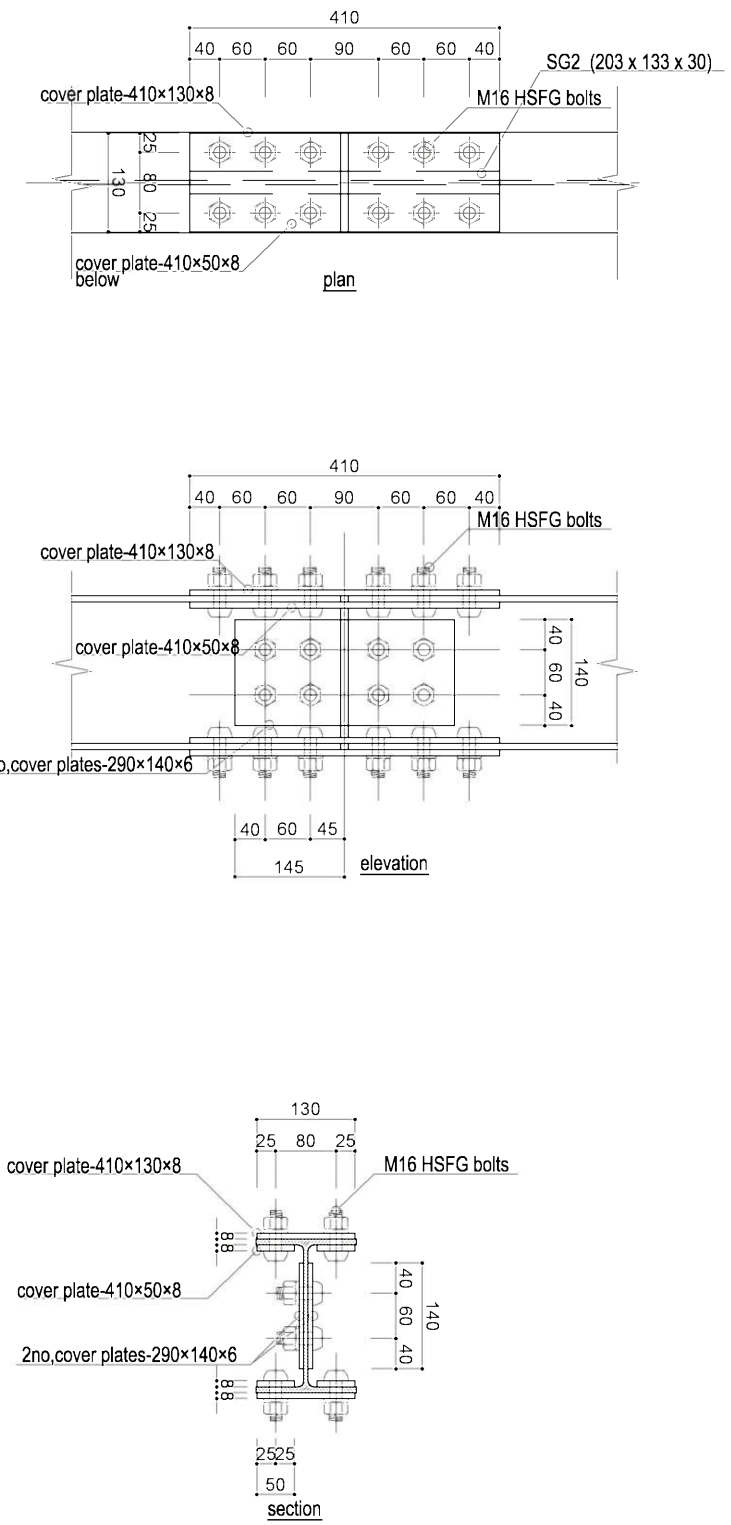
Detail A, B



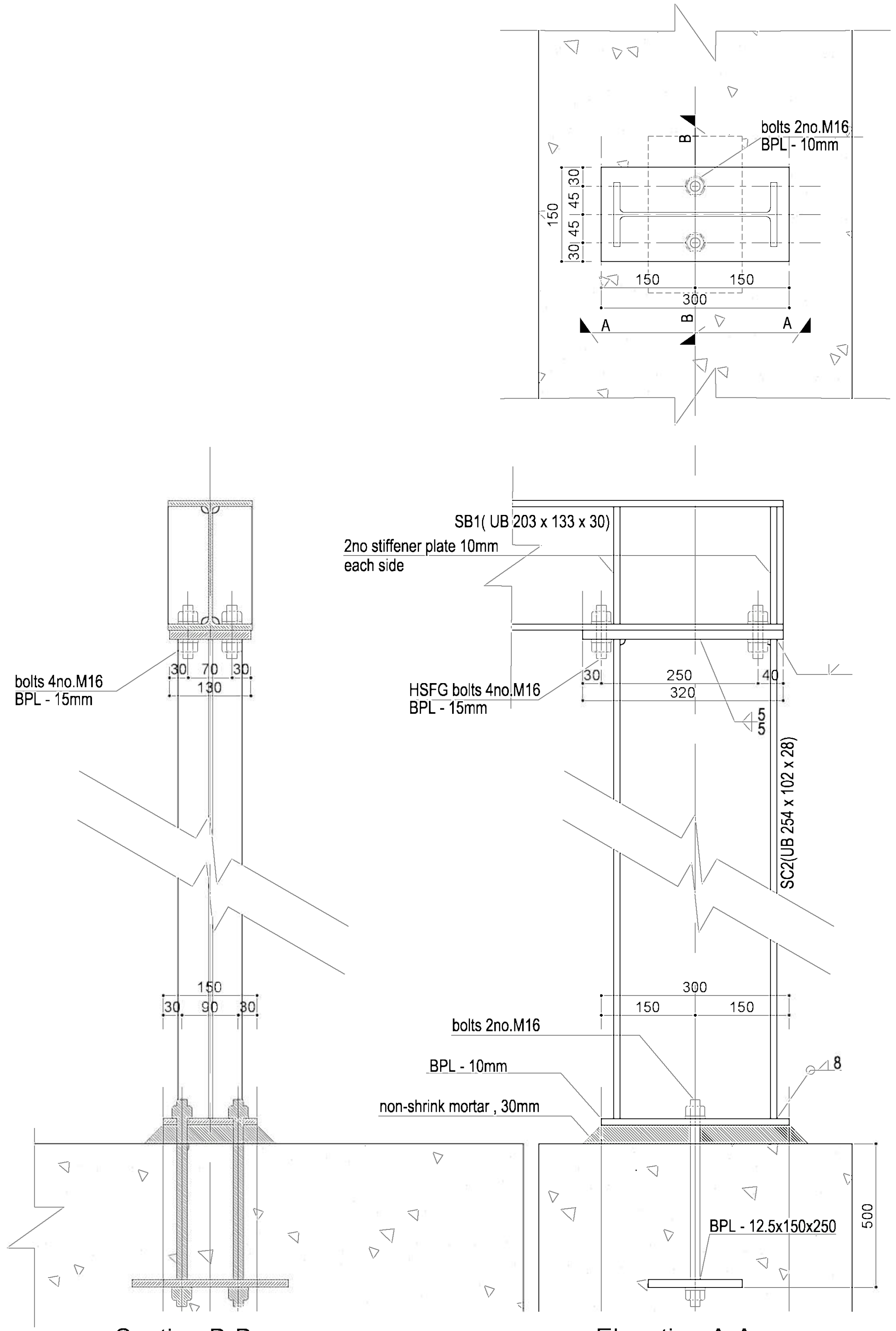
Section B-B

Elevation A-A

Splice Detail



Detail C, D



Section B-B

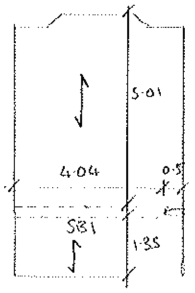
Elevation A-A

structured environment consulting structural and civil engineers	3F 2-4 Exmoor Street London W10 6BD tel : 020-8206-6215 / fax : 020-8206-6201 info@structured-environment.com	Address Garden Flat 96 Haverstock Hill, London NW3 2BD	Project Title Internal structural alterations	Drawing Title Steelwork details	SE Ref 11055	Scale @A3 S=1/10 date 15.06.11	Drawing number S-02

Structural Calculations

Project:	96 Haverstock Hill, London,
Client:	Melanie Pitt
Calculations by:	Ed Hollis MEng
	Structured Environment Limited, 3F 2-4 Exmoor Street,
	London W10 6BD
	T 020 8206 6215 F 020 8206 6201
Date:	June, 2011
SE Ref:	11055/C

96 Haverstock Hill — Steel beam design.



This beam carries 3.19m of existing timber floor load.

It spans 4m from column to column.

Loads onto SB1		DL (kN/m)	IL (kN/m)
3.19m timber floor	D: 3.19 × 0.6	1.91	
	I: 3.19 × 1.5		4.79

$1.35g_k + 1.5Q_k = 1.35 \times 1.91 + 1.5 \times 4.79 = 9.76$ kN/m [ult]

$M = \frac{wl^2}{8} = \frac{9.76 \times 4^2}{8} = 19.52$ kNm — M = 19.52 kNm

limit δ to L/360 = 11

$I_{req} = \frac{5wl^4}{384 E\delta} = \frac{5 \times 4.79 \times 4000^4}{384 \times 205 \times 10^3 \times 11}$

$= 708 \times 10^4$ mm^4 — $I_{req} = 708 \times 10^4$ mm^4

Blue Book

Try 178 × 102 × 19 UB

$L_E = 1.0\ L = 4.0$m

$M_{bRd} = 25.5$ kNm

$I_{y-y} = 1360 \times 10^4$ mm^4

$R_D = \frac{wL}{2} = \frac{1.91 \times 4.0}{2} = 3.82$ kN [wk]
$= 5.16$ kN [ult]

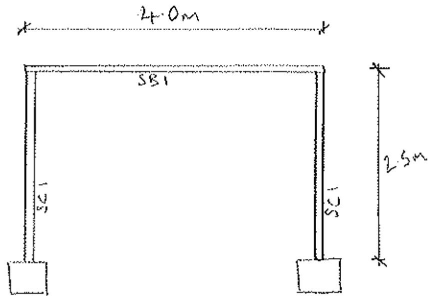
$R_I = \frac{wL}{2} = \frac{4.79 \times 4.0}{2} = 9.58$ kN [wk]
14.37 kN [ult]

Total $\delta_{D+I} = \frac{5wL^4}{384 EI} = \frac{5 \times 6.70 \times 4000^4}{384 \times 205 \times 10^3 \times 1360 \times 10^4} = 8.0$mm $= L/500$ OK.

Provide 178×102×19 UB

96 Haverstock Hill — Steel column design.

These columns support the reactions from SB1



$R_{wk} = 3.82 + 9.58 = 13.40\,kN$ [wk]

$5.16 + 14.37 = 19.53\,kN$ [ult]

$M_{corner} \approx \frac{wl^2}{12} = \frac{9.76 \times 4^2}{12} = 13.01\,kNm$ [ult]

Assume fixed at top, pinned at base.

$L_E = 2.0 \times L = 2 \times 2.5 = 5.0m$

$\frac{M}{M_{crd}} + \frac{f}{N_{bid}} < 1.0$

Blue Book

Try 90x90x5.0 SHS

$\frac{13.01}{18.8} + \frac{19.53}{146} = 0.83 < 1.0$ OK

Moments from moment frame

a) from lateral load — Take most onerous of wind load or 2.5% vertical.

Wind = 0.6 kN/m²
Aree = 10x10 = 100m²
load = 0.6 x 100 = 60kN
/2 buildings = 30 kN
/7 lateral walls = 4.29 kN

Total load of building = 1565 kN
2.5% = 238 kN
/7 lateral walls = 5.60 kN.

2.5% vertical load more onerous

Frame Sway Check

Using Virtual work method.

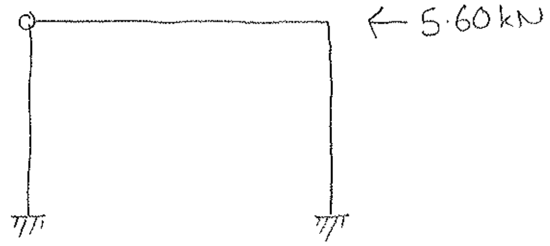
$$\delta = \frac{Ph^3}{6EI_c} + \frac{Ph^2 L}{12EI_b}$$

limit δ to $\frac{h}{250} = 10mm$

178 x 102 x 19UB and 100x100x8.0 SHS inadequate.

limited size of member within internal wall to 100mm

∴ use partial moment frame to keep left member size down.



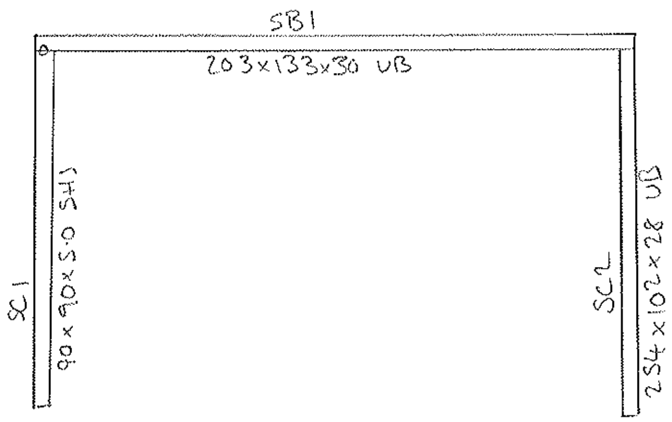
$$\delta = \frac{Ph^3}{3EI_c} + \frac{Ph^2 L}{3EI_b}$$

Blue book

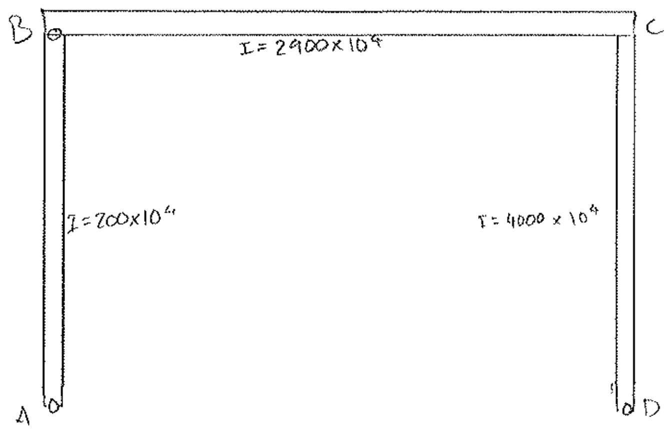
Try 203x133x30 UB for SB1 $I_{y-y} = 2900 \times 10^4 mm^4$
Try 254x102x28 UB for SC2 $I_{y-y} = 4000 \times 10^4 mm^4$

$$\delta = \frac{5600 \times 2500^3}{3 \times 205 \times 10^3 \times 4000 \times 10^4} + \frac{5600 \times 2500^2 \times 4000}{3 \times 205 \times 10^3 \times 2900 \times 10^4}$$

$= 11.4mm$. OK



Moments from moment frame



$k = \frac{I_b}{I_c} \cdot \frac{h}{l}$

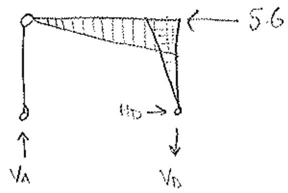
$= \frac{2900}{4000} \times \frac{2500}{4000}$

$= 0.45$

$m = 1 + k$

$= 1.45$

a) from lateral load (2.5% vertical load)

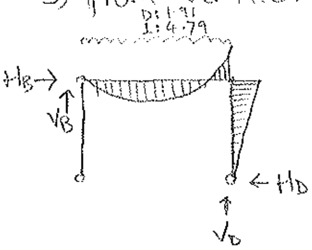


$V_A = -V_D = \frac{Ph}{l} = \frac{5.6 \times 2.5}{4} = 3.5\,kN$ [wk]

$H_D = 5.6\,kN$

$M_c = H_D . L = 5.6 \times 2.5 = 14\,kNm$ [wk]

b) from vertical load. [wk]



$V_D = \frac{wl(4k+5)}{8m}$ $\quad D = \frac{1.91 \times 4\,(4 \times 0.45 + 5)}{8 \times 1.45} = 4.48\,kN$

$I = \frac{4.79 \times 4\,(4 \times 0.45 + 5)}{8 \times 1.45} = 11.23\,kN$

$V_B = \frac{wl\,(4k+3)}{8m}$ $\quad D = \frac{1.91 \times 4 (4 \times 0.45 + 3)}{8 \times 1.45} = 3.16\,kN$

$I = \frac{4.79 \times 4\,(4 \times 0.45 + 3)}{8 \times 1.45} = 7.93\,kN$

$H_B = -H_D = \frac{wl^2}{8hm}$ $\quad D: \frac{1.91 \times 4^2}{8 \times 2.5 \times 1.45} = 1.05\,kN$

$I: \frac{4.79 \times 4^2}{8 \times 2.5 \times 1.45} = 2.64\,kN$

$M_c = \frac{wl^2}{8m} =$ $\quad D: \frac{1.91 \times 4^2}{8 \times 1.45} = 2.63\,kNm$

$I: \frac{4.79 \times 4^2}{8 \times 1.45} = 6.61\,kNm$

$M_{max} = \frac{wl^2(4k+3)^2}{128m^2}$ D: $\frac{1.91 \times 4^2 \times (4 \times 0.45 + 3)^2}{128 \times 1.45^2} = 2.62$ kNm

I: $\frac{4.79 \times 4^2 \times (4 \times 0.45 + 3)^2}{128 \times 1.45^2} = 6.56$ kNm

Total moments [ult]

M at midspan $= 1.35\,G_k + 1.5\,Q_k$

$= 1.35 \times 2.62 + 1.5 \times 6.56$

$= 13.38$ kNm [ult]

$\psi = 0.7$ for domestic

M at C $= 1.35\,G_k + 1.5\,Q_{k1} + 1.5\,\psi\,Q_{k2}$

$= 1.35 \times 2.63 + 1.5 \times 14 + 1.5 \times 0.7 \times 6.61$

$= 31.491$ [ult]

$V_A = 1.35\,G_k + 1.5\,Q_{k1} + 1.5\,\psi\,Q_{k2}$

$= 1.35 \times 3.16 + 1.5 \times 7.93 + 1.5 \times 0.7 \times 3.5$

$= 19.84$ kN [ult]

$V_D = 1.35\,G_k + 1.5\,Q_{k1} + 1.5\,\psi\,Q_{k2}$

$= 1.35 \times 4.48 + 1.5 \times 11.23 + 1.5 \times 0.7 \times 3.5$

$= 26.57$ kN [ult]

$H_A = 1.35\,G_k + 1.5\,Q_k$

$= 1.35 \times 1.05 + 1.5 \times 2.64$

$= 5.38$ kN [ult]

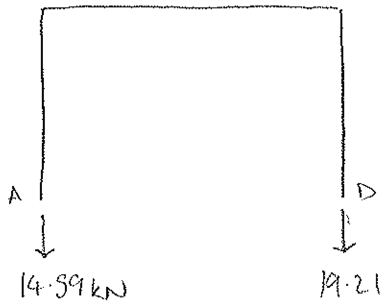
$H_D = 1.35\,G_k + 1.5\,Q_{k1} + 1.5\,\psi\,Q_{k2}$

$= 1.35 \times 1.05 + 1.5 \times 5.6 + 1.5 \times 0.7 \times 2.64$

$= 12.59$ kN [ult]

96 Haverstock Hill – foundation design.

Take a conservative ground bearing pressure of 50kN/m²



foundation at A.

$$\frac{14.59kN}{50kN/m^2} = 0.29m^2 \text{ minimum}$$

Provide 0.7 × 0.7m foundation = $0.49m^2$

Bottom of foundation – 700mm below ground level

foundation at D

$$\frac{19.21kN}{50kN/m^2} = 0.38m^2 \text{ minimum}$$

Provide 1.0 × 0.5m foundation = $0.50m^2$

Bottom of foundation – 700mm below ground level.