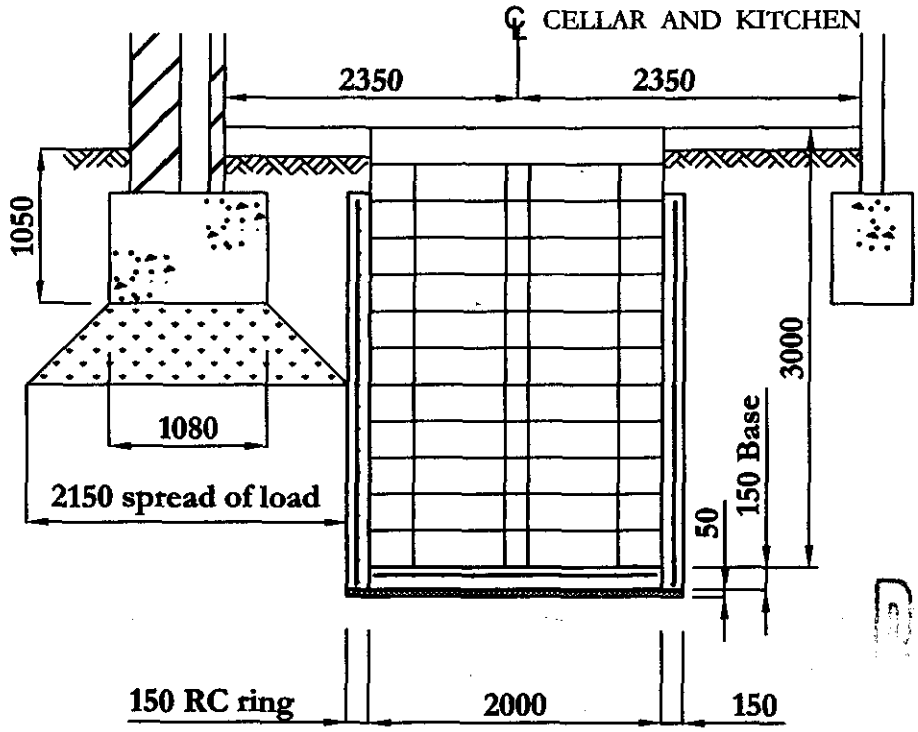
JOB No C. 6215 **CALCULATIONS** **SHEET No** 1

JOB NAME 16 Provost Road London NW3 4ST **DRG No**

INSTALLATION OF A 3.00 METRE DEEP SPIRAL CELLAR



Section thro' Cellar
(scale 1:50)

150mm thick In-situ Reinforced Concrete Ring cast to top of adjacent foundation level.

Reinforcement for RC Ring to be:
T10 vertical bars @ 300mm centres
T10 hoop bars @ **150mm centres**

150mm thick In-situ concrete base reinforced with A193 mesh in the top, and laid on 50mm Lean mix concrete / Blinding

Concrete to be:
30N/mm² at 28 days using a minimum SRPC content of 280 kg/m³;
20mm maximum size aggregate;
Water/Cement ratio of less than 0.6.

Installation: This is to comply with HSE's Approved Code of Practice & BS 8000, with temporary shoring used above and below existing foundation level. Should the arrangement differ from that shown, please inform Chappell & Lynn.

Details These calculations are to be read in conjunction with Spiral Cellars details as shown on Drawings numbered C.1689 / 2 & 3.

Design As the Cellar is circular on plan, it has good resistance to surcharge from the surrounding soil. However, as the Cellar is positioned adjacent to load bearing walls. there is unequal pressure on the Cellar wall that requires the RC ring shown above. See Sheet No 2 for design of the RC Ring.

CHAPPELL & LYNN CONSULTING STRUCTURAL ENGINEERS
54 BELMONT RISE CHEAM SUTTON SURREY SM2 6EQ TEL: 020 8643 7600

DATE Jan 2007
DRAWN J A Ross

R.C. Ring for 3.00m deep Spiral Cellar
located in the Kitchen

Design Loads:

Main Roof	DL = Tiles, Battens, Boards, Rafters, Ceiling	= 1.25 x Yf1.4 = 1.75kN/m²
	LL =	= 0.75 x Yf1.6 = 1.20kN/m²
1st Floor	DL = Boards, Joist, Ceiling	= 0.60 x Yf1.4 = 0.84kN/m²
	LL =	= 1.50 x Yf1.6 = 2.40kN/m²
2nd Floor	DL = Boards, Joist, Ceiling	= 0.60 x Yf1.4 = 0.84kN/m²
	LL =	= 1.50 x Yf1.6 = 2.40kN/m²
Walls	DL = 275 Cavity brick, Render, Plaster	= 5.00 x Yf1.4 = 7.00kN/m²
Walls	DL = 105 Solid brick, Plaster	= 2.75 x Yf1.4 = 3.90kN/m²
Strip Footing	DL = 550mm wide x 750mm deep	= 3.30 x Yf1.4 = 4.60kN/m run

FOR THE WORST CASE:
Consider Loads From the Dividing Piers between the Family Room and the Kitchen :
With the exception of the strip footing, the above loads act on a steel beam spanning 3.4 metres.

Main Roof Load	= 2.95 x 3.95	= 11.70kN/m
1st Floor	= 3.24 x 3.95	= 12.80kN/m
2nd Floor	= 3.24 x 3.95	= 12.80kN/m
Wall above beam	= 3.90 x 9.00	= 35.10kN/m
		= 72.40kN/m

Beam End Reaction = 0.5 x 3.4 x 72.4 = 123.1kN
Now consider Load in 730mm length of pier acting on (730 + 450)mm length of strip footing:

Beam End Reaction from above	= 123.10kN
Solid Wall up to underside of steel beam = 0.73 x 3.90 x 3.5	= 10.00kN
Strip footing 1.33m long = 0.45 x 0.45 x 8.00kN/m3 x 1.4 x 1.18	= 2.70kN
TOTAL =	136.00kN

Bearing Pressure on assumed 450mm wide x 1330 long footing = 136.0 / 0.45 x 1.18 = 256 kN/m²

Reduced Pressure allowing for a spread of load over (102 + 2 x 350mm) x (730 + 950) long footing
= 136.0 / 0.80 x 1.68 = 101.2 kN/m²

Active Pressure Coefficient = 0.4
Therefore Horizontal Load on Cellar ω = 101.2 x 0.4 = 40.5 kN/m²
Maximum Bending Moment on Cellar Ring = $\omega R^2 / 4$ See Calculation sheets C.1689/1 - 3)
Allowing for a 150mm thick concrete wall R = 1.075 m
Therefore BM = 40.5 x $1.075^2 / 4$ = 11.7 kNm < 14.10

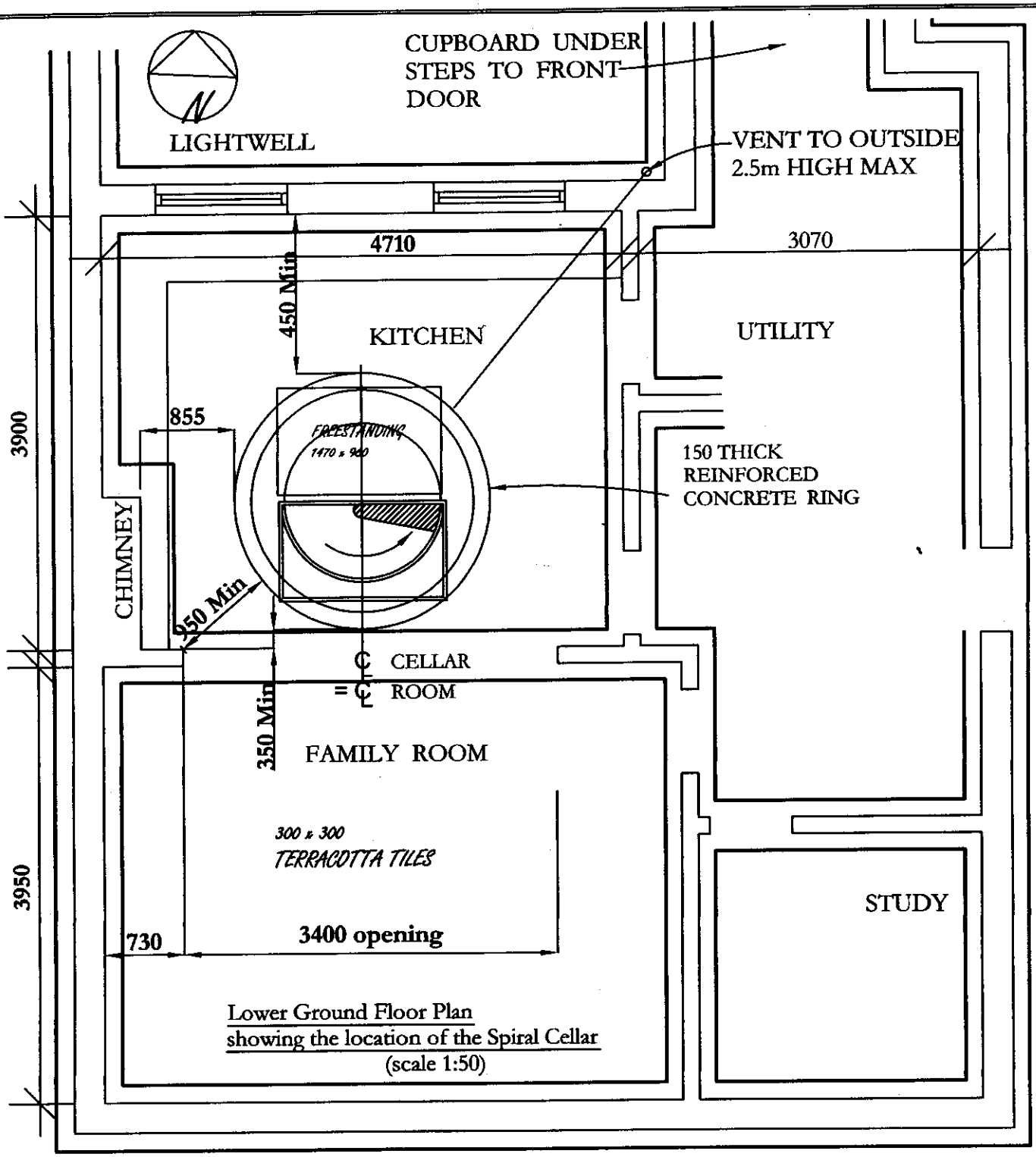
From Design Charts:
For a 150mm thick Ring with T10's @ 150mm centres, Allowable Max BM = 14.10 kNm > 10.73

Use Hoop Bars T10 @ 150 Centres and Vertical Bars T10 @ 300 Centres

CALCULATIONS

JOB No C. 6215 **SHEET No** 3

JOB NAME 16 Provost Road London NW3 4ST **DRG No**



Lower Ground Floor Plan
showing the location of the Spiral Cellar
(scale 1:50)

NOTES:

1. The overall thickness of the ground bearing floor slab plus screed and finishes is assumed to be 200mm.
2. It is assumed that the ground water level will not affect the stability of the Spiral Cellar.
3. All existing foundation details shown are assumed.

CHAPPELL & LYNN CONSULTING STRUCTURAL ENGINEERS
54 BELMONT RISE CHEAM SUTTON SURREY SM2 6EQ TEL: 020 8643 7600

DATE Jan 2007
DRAWN J A Ross