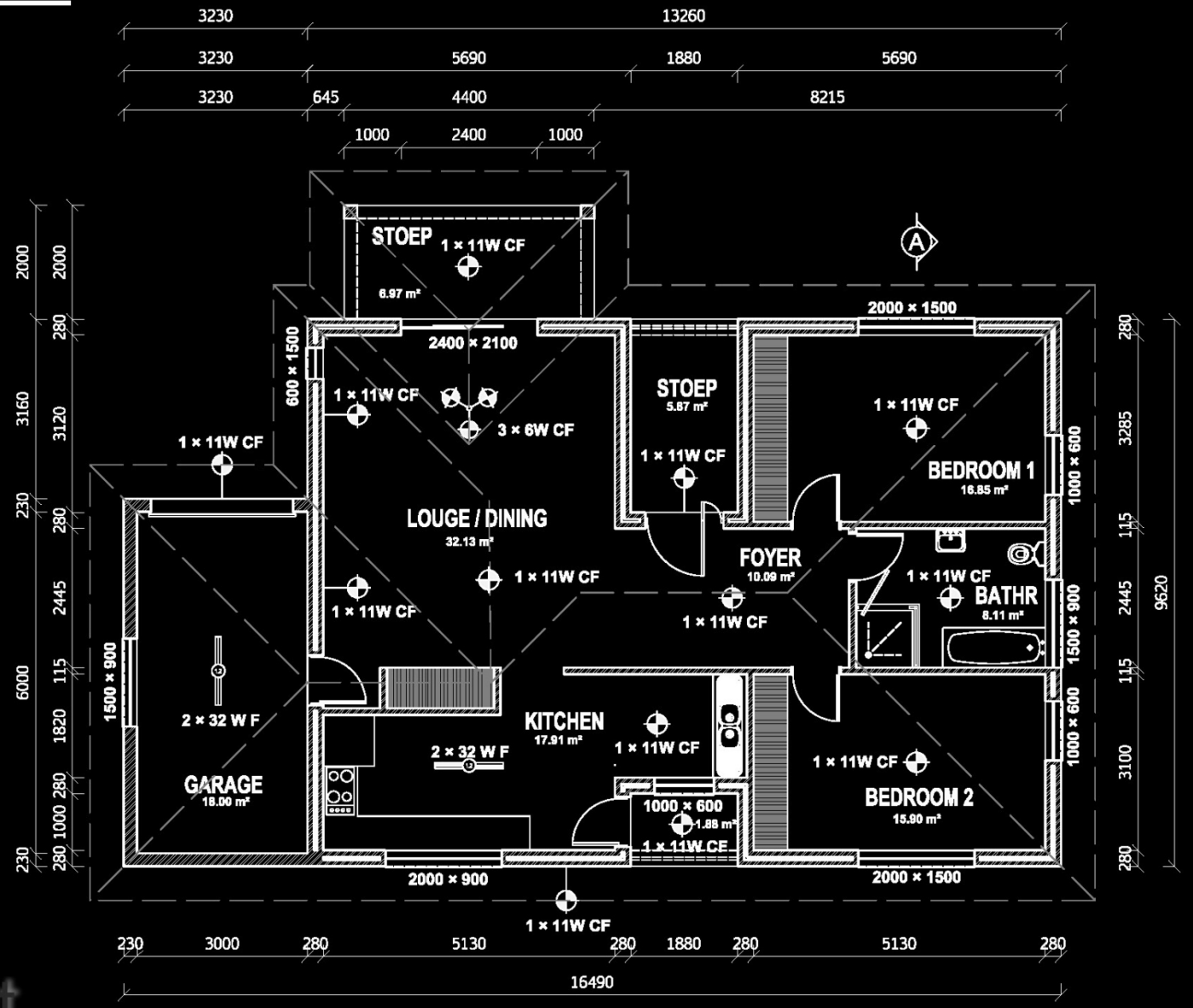
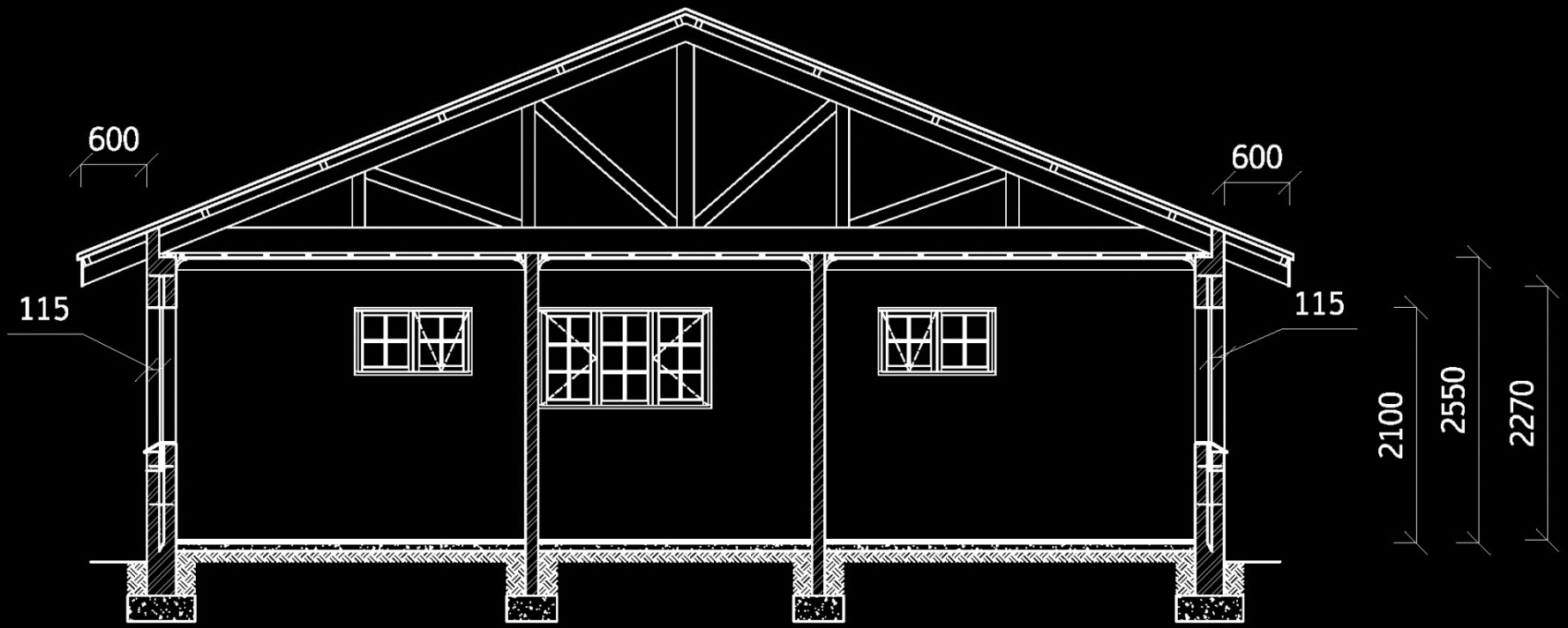
ZONE 1



Conductance: A × U

SHG: A × S × E



NATURAL VENTILATION

CHECK FOR COMPLIANCE WITH 10400XA

NET FLOOR AREA: 100.99m²

GLAZING AREA:

2.4 × 2.1 =	5.04
2 × 1.5 × 2 =	6.00
0.6 × 1.0 × 3 =	1.80
1.5 × 0.9 =	1.35
2.0 × 0.9 =	1.80
0.6 × 1.5 =	0.90
	16.89

16.89/100.99 x 100 = 16.72%

Do not comply with max of 15% as per SANS10400XA

NATURAL VENTILATION

CONSTANTS:

CONDUCTANCE: 100.99 × 1.2 = 121.19
SHG: 100.99 × 0.15 = 15.15

CONDUCTANCE:

Use clear glass in wooden frame

A × U = 16.89 × 5.6
= 94.58 (< 121.19 √)

SOLAR HEAT GAIN:

P_1 = 600 + 115 = 715, P_2 = 600 + 115 + 1280 = 1995;
P_3 = 1000 + 600 = 1600
G = 2270 – 2100 = 170 (<500)

2100 Door: P/H = 1600/2270 = 0.70
1500 Window: P/H = 715/1670 = 0.43
900 Window: P/H = 715/1070 = 0.67
600 $Window_1$: P/H = 715/770 = 0.93
600 $Window_2$: P/H = 1995/770 = 2.59

NORTH:

5.04 × 0.77 × 0.28 = 1.09
3.00 × 0.77 × 0.36 = 0.83

EAST:

(0.60 × 0.77 × 0.46) × 2 = 0.43
1.35 × 0.77 × 0.61 = 0.63

SOUTH:

3.00 × 0.77 × 0.36	= 0.83
1.80 × 0.77 × 0.31	= 0.43
0.60 × 0.77 × 0.17	= 0.08

WEST:

0.90 × 0.77 × 0.90	= 0.62

TOTAL **= 4.94 (<15.15)**

$$A_1 [S_1 (C_A \times S_{H1} + C_B \times S_{C1}) + C_C \times U_1]$$

$A_{1,2,3}$	is the area of each glazing element
$C_{A,B,C}$	are the energy constants in table D1
$S_{1,2,3}$	is the SHGC of each glazing element in Table 6
$S_{H1,H2,H3}$	is the heating shading multiplier for each value element given in table D2
$S_{C1,C2,C3}$	is the cooling shading multiplier for each value element given in table D3
$U_{1,2,3}$	is the total U-value of each glazing element given in table 6

2100 Door: P/H = 1600/2270 = 0.70
1500 Window: P/H = 715/1670 = 0.43
900 Window: P/H = 715/1070 = 0.67
600 Window$_1$: P/H = 715/770 = 0.93
600 Window$_2$: P/H = 1995/770 = 2.59

G = 2270 – 2100 = 170 (<500)

ARTIFICIAL VENTILATION:

ENERGY INDEX:

NORTHERN FAÇADE:	13.26 × 2.550	= 33.81
	33.81 × 0.220	= 7.44
EASTERN FAÇADE:	9.62 × 2.550	= 24.53
	24.53 × 0.220	= 5.40
SOUTHERN FAÇADE:	13.26 × 2.550	= 33.81
	33.81 × 0.220	= 7.44
WESTERN FAÇADE:	9.62 × 2.550	= 24.53
	24.53 × 0.220	= 5.40

NORTHERN FAÇADE:

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 5.04[0.77(-0.37 \times 0.88 + 1.53 \times 0.64) + -0.01 \times 5.6]$

$= 5.04[0.77\ (-0.33 + 0.98)\ -0.06]$

$= 5.04[0.77(0.65)\ -0.06]$

$= 5.04[0.50 – 0.06]$

$= 5.04 \times 0.44$

$= 2.22$

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 3[0.77(-0.37 \times 0.96 + 1.53 \times 0.79) + -0.01 \times 5.6]$

$= 3[0.77(-0.36 + 1.21)\ -0.06]$

$= 3[0.77(0.85)\ -0.06]$

$= 3[0.65\ -0.06]$

$= 3 \times 0.59$

$= 1.77$

$2.22 + 1.77 = 3.99\ (<7.44\ \surd)$

EASTERN FAÇADE:

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 1.35[0.77(-0.59 \times 0.83 + 1.39 \times 0.75) + 0.03 \times 5.6]$

$= 1.35[0.77(-0.49 + 1.04) + 0.17]$

$= 1.35[0.77(0.55) + 0.17]$

$= 1.35(0.42 + 0.17)$

$= 1.35 \times 0.59$

$= 0.80$

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 0.6[0.77(-0.59 \times 0.73 + 1.39 \times 0.65) + 0.03 \times 5.6]$

$= 0.6[0.77(-0.43 + 0.90) + 0.17]$

$= 0.6[0.77(0.47) + 0.17]$

$= 0.6(0.36+ 0.17)$

$= 0.6 \times 0.53$

$= 0.32$

2 Windows $= 0.32 \times 2 = 0.64$

$0.80 + 0.64 = 1.44$ $(<5.40$ √)

SOUTHERN FAÇADE:

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 3[0.77(-0.87 \times 0.93 + 0.38 \times 0.88) + 0.15 \times 5.6]$

$= 3[0.77(-0.81 + 0.33) + 0.84]$

$= 3[0.77(-0.27) + 0.84]$

$= 3(-0.21 + 0.84)$

$= 3 \times 0.63$

$= 1.89$

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 1.8[0.77(-0.87 \times 0.87 + 0.38 \times 0.81) + 0.15 \times 5.6]$

$= 1.8[0.77(-0.76 + 0.31) + 0.84]$

$= 1.8[0.77(-0.45) + 0.84]$

$= 1.8(-0.35 + 0.84)$

$= 1.8 \times 0.49$

$= 0.88$

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 0.6[0.77(-0.87 \times 0.64 + 0.38 \times 0.60) + 0.15 \times 5.6]$

$= 0.6[0.77(-0.56 + 0.23) + 0.84]$

$= 0.6[0.77(-0.33) + 0.84]$

$= 0.6(-0.25 + 0.84)$

$= 0.6 \times 0.59$

$= 0.35$

$1.89 + 0.88 + 0.35 = 3.12 (<7.44 \surd)$

WESTERN FAÇADE:

$A[S(C_A \times S_H + C_B \times S_C) + C_C \times U]$ $= 0.9[0.77(-0.85 \times 0.91 + 1.07 \times 0.85) + 0.08 \times 5.6]$

$= 0.9[0.77(-0.77 + 0.91) + 0.45]$

$= 0.9[0.77(-0.14) + 0.45]$

$= 0.9(-0.11 + 0.45)$

$= 0.9 \times 0.34$

$= 0.31$ (<5.40 √)

BUILDING SUITABLE FOR AIRCONDITIONING / MECHANICAL VENTILATION