

**SINGAPORE CIVIL DEFENCE FORCE
FIRE SAFETY & SHELTER DEPARTMENT**



HQ SINGAPORE CIVIL DEFENCE FORCE
91 Ubi Ave 4 Singapore 408827 Fax no. 68481488
Website: <http://www.scdf.gov.sg>

Please quote our ref. no in all future correspondence

Our File Ref: CD/FSSB/12/01/03/04

DID: 68481470
FAX: 68481493

6 Oct 2003

President, Singapore Institute of Architects (SIA)
President, Institution of Engineers, Singapore (IES)
President, Association of Consulting Engineers, Singapore (ACES)
President, Real Estates Development Association of Singapore (REDAS)
Registrar, Board of Architects (BOA)
Registrar, Professional Engineers Board (PEB)

Dear Sirs,

Permissible Variations of Civil Defence Shelter Technical Requirements

Waiver applications are submitted by QPs when certain requirements stipulated in the shelter code, "Technical Requirements for Household and Storey Shelters" cannot be fully complied with. The purpose of this circular is to regularise a number of areas in the technical requirements frequently surfaced in waiver applications. These common waiver items are listed under Annex A of this circular, and shall henceforth be deemed as permissible with regard to civil defence shelter requirements i.e. no need for waiver applications.

2 We would appreciate it if you could disseminate the contents of this circular to members of your Institution or Association.

3 Should you require further clarifications on the above items, please contact the undersigned at 68481470 or MAJ Chan Keen Mun at 68481406.

Yours faithfully,

(Transmitted via e-mail)
CPT Ng Shu Herng
for Commissioner
Singapore Civil Defence Force

cc

Members of FSSD Standing Committee

President, SISV

CEO, HDB

CE, LTA

Attn: Mohinder Singh

CEO, BCA

Attn: Deputy CEO (Building Control)

Director (Special Functions)

Senior Manager (CDSO)

Manager (CDAS/CDSO)

S/No	Clause stipulated in Technical Requirements for HS 2001	Waiver Issue	Conditions for Acceptance
1	<p>Clause 2.3.1</p> <p>A HS can also be located in the basement storey of a landed dwelling unit. It is termed as a basement HS.</p>	<p>To apply technical requirements of basement HS if the wall of a HS is in direct contact with earth.</p>	<p>Basement HS technical requirements are applicable if any wall of the HS retains earth up to its full height and the earth extends out by a minimum distance of 2500 mm from the wall (See FIGURE 1).</p>
2	<p>Clause 2.3.2</p> <p>In a building of more than one storey, the HS (or NS, where applicable) on every storey shall be located one on top of the other to form a vertical tower with its walls continuing to the foundation.</p>	<p>Developer may wish to provide bigger penthouse dwelling unit at the top of the building. Hence, based on GFA of the larger dwelling unit, larger internal floor area of HS has to be provided as compared against the area of the HS in smaller dwelling units below the penthouse.</p>	<p>Up to 2 larger HS are allowed to be located at the top of the HS tower. Only one wall of the larger HS is allowed to be projected beyond the HS walls below it. The minimum thickness of the projected slab shall be that of wall of the larger HS (See FIGURE 2).</p>
3	<p>Clause 2.3.3</p> <p>The setback distances of HS wall shall comply with Table 2.3.3 (a) or Table 2.3.3 (b).</p> <p>Clause 2.3.4</p> <p>The setback distances of HS wall shall comply with table 2.3.4 (a) or table 2.3.4 (b).</p>	<p>Provision of RC ceiling slab does not meet the minimum setback distance requirements.</p>	<p>Trellis constructed of RC or steel hollow sections may be used to make up for the shortfall in setback distance for HS walls (where the HS door is not located). However, a minimum 1500 mm RC ceiling slab from the HS wall shall be provided (See FIGURE 3b). A perpendicular or parallel trellis arrangement, or a combination of both, with respect to the HS wall concerned, shall comply with the geometrical configuration (See FIGURE 3a).</p> <p>Provision of trellis to make up for shortfall in setback distance of HS wall with HS door is not allowed, i.e. RC ceiling slab with required minimum setback distance is to be provided.</p>

S/No	Clause stipulated in Technical Requirements for HS 2001	Waiver Issue	Conditions for Acceptance
4	<p>Clause 2.3.4 The setback distances of HS wall shall comply with table 2.3.4 (a) or table 2.3.4 (b).</p>	<p>Provision of RC ceiling slab does not meet the minimum setback distance requirements.</p>	<p>If down-hang beam and RC ledge/trellis are introduced to meet the minimum setback distance of HS wall, determined based on the effective storey height (storey height minus d), a minimum 1500 mm RC ceiling slab from the HS wall shall be provided (See FIGURE 4). Provision of trellis to make up for shortfall in setback distance of HS wall with HS door is not allowed.</p>
5	<p>Clause 2.3.3 The setback distances of HS wall shall comply with table 2.3.3 (a) or table 2.3.3 (b). Clause 2.3.4 The setback distances of HS wall shall comply with table 2.3.4 (a) or table 2.3.4 (b).</p>	<p>Minimum setback distance tables in the “Technical requirement of Household Shelters” does not cater for storey height higher than 4000 mm.</p>	<p>Minimum setback distance of HS with storey height higher than 4000 mm shall comply with Tables A & B (for HS walls without RC down- hang beam at the EBL), Tables C-F (for HS walls with RC down-hang beam at the EBL) or Table G for basement HS, whichever is applicable (See FIGURE 5). Minimum HS wall thickness shall comply with Table H.</p>
6	<p>Clause 7.2.2 (g) - viz not permitted works in HS Modifying, changing, removing or tampering of HS door.</p>	<p>Owner/ developer desires the installation of peacetime door in existing HS.</p>	<p>Owner/ appointed contractor allowed to erect peacetime door frame on the inside face of the existing HS door frame/ jamb subject to the following conditions:</p> <ol style="list-style-type: none"> a. Only drilling into the inside face of the HS door frame/ jamb to affix removable screws on inserts, provided the depth of the insert shall not exceed 50 mm, is permitted to support the peacetime door frame. Use of power driven nails and hacking of the HS door frame/ jamb is strictly prohibited. b. Except for peacetime door hinge, drilled holes at the inside face of the HS door frame/ jamb shall be spaced at least 300 mm apart.

S/No	Clause stipulated in Technical Requirements for HS 2001	Waiver Issue	Conditions for Acceptance
7	Clause 5.2 Only HS doors of an approved design shall be used.	Provision of a second rebate in the door frame with mortar box, for mounting a peacetime door.	Door frame/jamb with two rebates (See Figure 6 for example) is allowed subject to consultation with BCA on details before fabrication.

Table A: Minimum Setback Distances of HS Walls without Reinforced Concrete Down-Hang Beam along EBL (GFA > 45 m²)
To supersede Table 2.3.3(a)

Storey Height (mm) Column (1)	Setback Distance of any One HS Wall (mm) Column (2)	Setback Distance of Remaining Three HS Walls (mm) Column (3)
$2500 \leq Ht \leq 2800$	2000	2750
$2800 < Ht \leq 3000$	2200	2900
$3000 < Ht \leq 3500$	2500	3100
$3500 < Ht \leq 4000$	2700	3300
$4000 < Ht \leq 4500$	2900	3600
$4500 < Ht \leq 5000$	3150	3850
$5000 < Ht \leq 5500$	3400	4100
$5500 < Ht \leq 6000$	3600	4300
$6000 < Ht \leq 6500$	3850	4550
$6500 < Ht \leq 7000$	4100	4800
$7000 < Ht \leq 7500$	4300	5000
$7500 < Ht \leq 8000$	4550	5250

Table B: Minimum Setback Distances of HS Walls without Reinforced Concrete Down-Hang Beam along EBL (GFA ≤ 45 m²)
To supersede Table 2.3.3(b)

Storey Height (mm) Column (1)	Setback Distance of any One HS Wall (mm) Column (2)	Setback Distance of Remaining Three HS Walls (mm) Column (3)
$2500 \leq Ht \leq 2800$	2750	2000
$2800 < Ht \leq 3000$	2900	2200
$3000 < Ht \leq 3500$	3100	2500
$3500 < Ht \leq 4000$	3300	2700
$4000 < Ht \leq 4500$	3600	2900
$4500 < Ht \leq 5000$	3850	3150
$5000 < Ht \leq 5500$	4100	3400
$5500 < Ht \leq 6000$	4300	3600
$6000 < Ht \leq 6500$	4550	3850
$6500 < Ht \leq 7000$	4800	4100
$7000 < Ht \leq 7500$	5000	4300
$7500 < Ht \leq 8000$	5250	4550

Table C: Minimum Setback Distances of One HS Wall with Reinforced Concrete Down-Hang Beam along EBL (GFA > 45 m²)
To supersede Table 2.3.4(a)

Effective Storey Height (mm) Column (1)	Setback Distance of HS Wall (mm) Column (2)
Ht ≤ 2200	1800
2200 < Ht ≤ 2800	2000
2800 < Ht ≤ 3000	2200
3000 < Ht ≤ 3500	2500
3500 < Ht ≤ 4000	2700
4000 < Ht ≤ 4500	2900
4500 < Ht ≤ 5000	3150
5000 < Ht ≤ 5500	3400
5500 < Ht ≤ 6000	3600
6000 < Ht ≤ 6500	3850
6500 < Ht ≤ 7000	4100
7000 < Ht ≤ 7500	4300
7500 < Ht ≤ 8000	4550

Table D: Minimum Setback Distances of the Other HS Walls with Reinforced Concrete Down-Hang Beam along EBL (GFA > 45 m²)
To supersede Table 2.3.4(b)

Effective Storey Height (mm) Column (1)	Setback Distance of HS Wall (mm) Column (2)
Ht ≤ 2200	2550
2200 < Ht ≤ 2800	2750
2800 < Ht ≤ 3000	2900
3000 < Ht ≤ 3500	3100
3500 < Ht ≤ 4000	3300
4000 < Ht ≤ 4500	3600
4500 < Ht ≤ 5000	3850
5000 < Ht ≤ 5500	4100
5500 < Ht ≤ 6000	4300
6000 < Ht ≤ 6500	4550
6500 < Ht ≤ 7000	4800
7000 < Ht ≤ 7500	5000
7500 < Ht ≤ 8000	5250

**Table E: Minimum Setback Distances of up to 3 HS Walls with Reinforced Concrete Down-Hang Beam along EBL (GFA $\leq 45 \text{ m}^2$)
To supersede Table 2.3.4(c)**

Effective Storey Height (mm) Column (1)	Setback Distance of HS Wall (mm) Column (2)
Ht ≤ 2200	1800
2200 < Ht ≤ 2800	2000
2800 < Ht ≤ 3000	2200
3000 < Ht ≤ 3500	2500
3500 < Ht ≤ 4000	2700
4000 < Ht ≤ 4500	2900
4500 < Ht ≤ 5000	3150
5000 < Ht ≤ 5500	3400
5500 < Ht ≤ 6000	3600
6000 < Ht ≤ 6500	3850
6500 < Ht ≤ 7000	4100
7000 < Ht ≤ 7500	4300
7500 < Ht ≤ 8000	4550

**Table F: Minimum Setback Distances of 4th HS Wall with Reinforced Concrete Down-Hang Beam along EBL (GFA $\leq 45 \text{ m}^2$)
To supersede Table 2.3.4(d)**

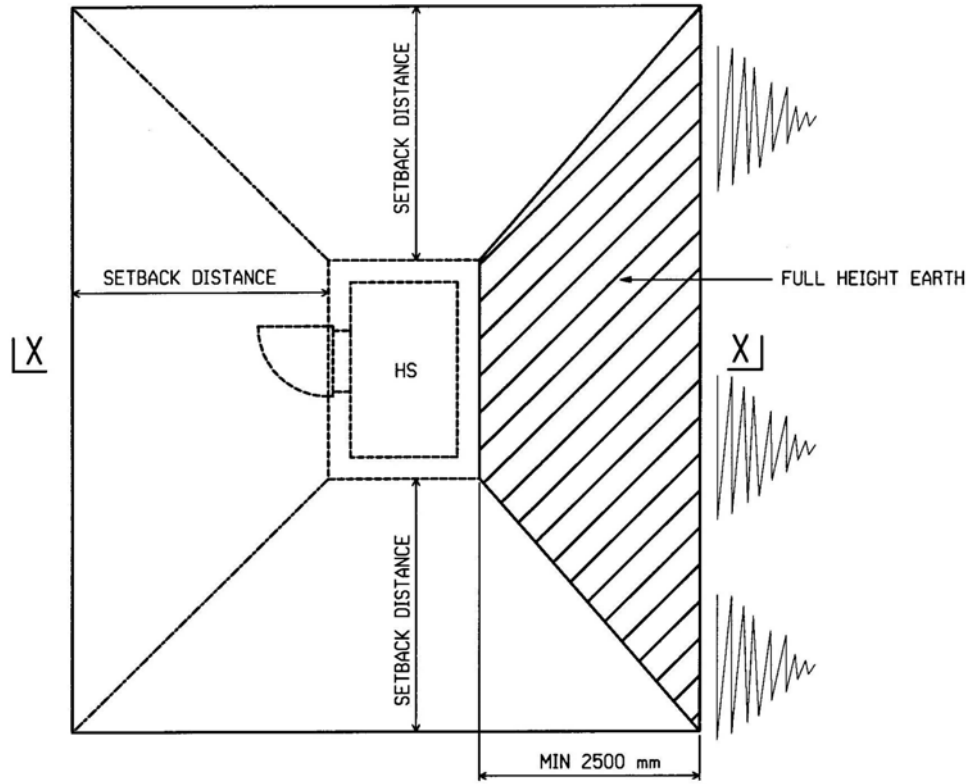
Effective Storey Height (mm) Column (1)	Setback Distance of HS Wall (mm) Column (2)
Ht ≤ 2200	2550
2200 < Ht ≤ 2800	2750
2800 < Ht ≤ 3000	2900
3000 < Ht ≤ 3500	3100
3500 < Ht ≤ 4000	3300
4000 < Ht ≤ 4500	3600
4500 < Ht ≤ 5000	3850
5000 < Ht ≤ 5500	4100
5500 < Ht ≤ 6000	4300
6000 < Ht ≤ 6500	4550
6500 < Ht ≤ 7000	4800
7000 < Ht ≤ 7500	5000
7500 < Ht ≤ 8000	5250

Table G: Minimum Setback Distances of Basement HS Walls (Facing Reinforced Concrete Basement Storey Walls with Opening)
To supersede Table 2.3.5

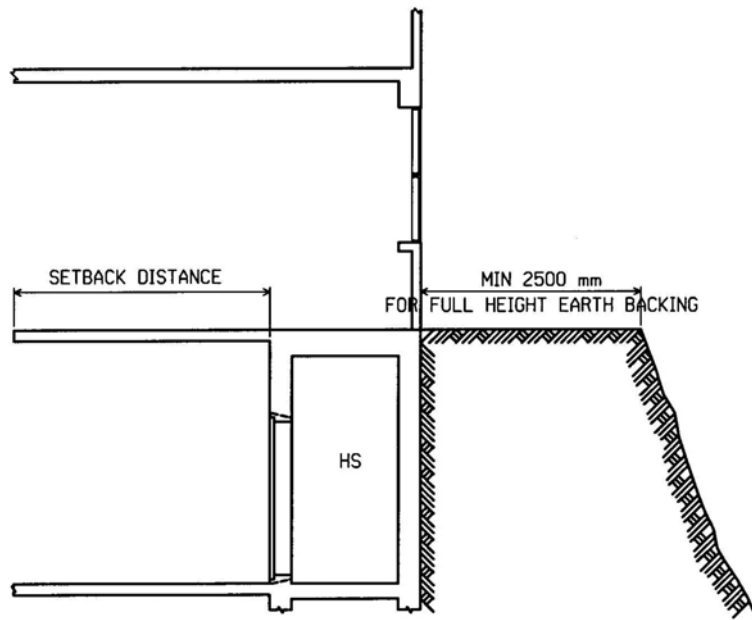
Storey Height (mm) Column (1)	Setback Distance of HS Wall (mm) Column (2)
$2500 \leq Ht \leq 2800$	2750
$2800 < Ht \leq 3000$	2900
$3000 < Ht \leq 3500$	3100
$3500 < Ht \leq 4000$	3300
$4000 < Ht \leq 4500$	3600
$4500 < Ht \leq 5000$	3850
$5000 < Ht \leq 5500$	4100
$5500 < Ht \leq 6000$	4300
$6000 < Ht \leq 6500$	4550
$6500 < Ht \leq 7000$	4800
$7000 < Ht \leq 7500$	5000
$7500 < Ht \leq 8000$	5250

Table H: Minimum HS Wall Thickness
To supersede Table 2.4(a)

Storey Height (mm)	HS Clear Height (mm)	Setback Distance of HS Wall (mm)	HS Wall Thickness (mm)
Ht \leq 4000	$2400 \leq Ht \leq 2700$	≤ 6000	250
		> 6000	200
	$2700 < Ht \leq 2900$	≤ 6000	275
		> 6000	225
	$2900 < Ht \leq 3900$	≤ 6000	300
		> 6000	250
$4000 < Ht \leq 6000$	$2400 \leq Ht \leq 2700$	≤ 7000	250
		> 7000	200
	$2700 < Ht \leq 2900$	≤ 7000	275
		> 7000	225
	$2900 < Ht \leq 3900$	≤ 7000	300
		> 7000	250
$6000 < Ht \leq 8000$	$2400 \leq Ht \leq 2700$	≤ 8000	250
		> 8000	200
	$2700 < Ht \leq 2900$	≤ 8000	275
		> 8000	225
	$2900 < Ht \leq 3900$	≤ 8000	300
		> 8000	250



PLAN



SECTION X - X

FIGURE 1 : HS WALL IN CONTACT WITH EARTH
THROUGHOUT ITS FULL HEIGHT

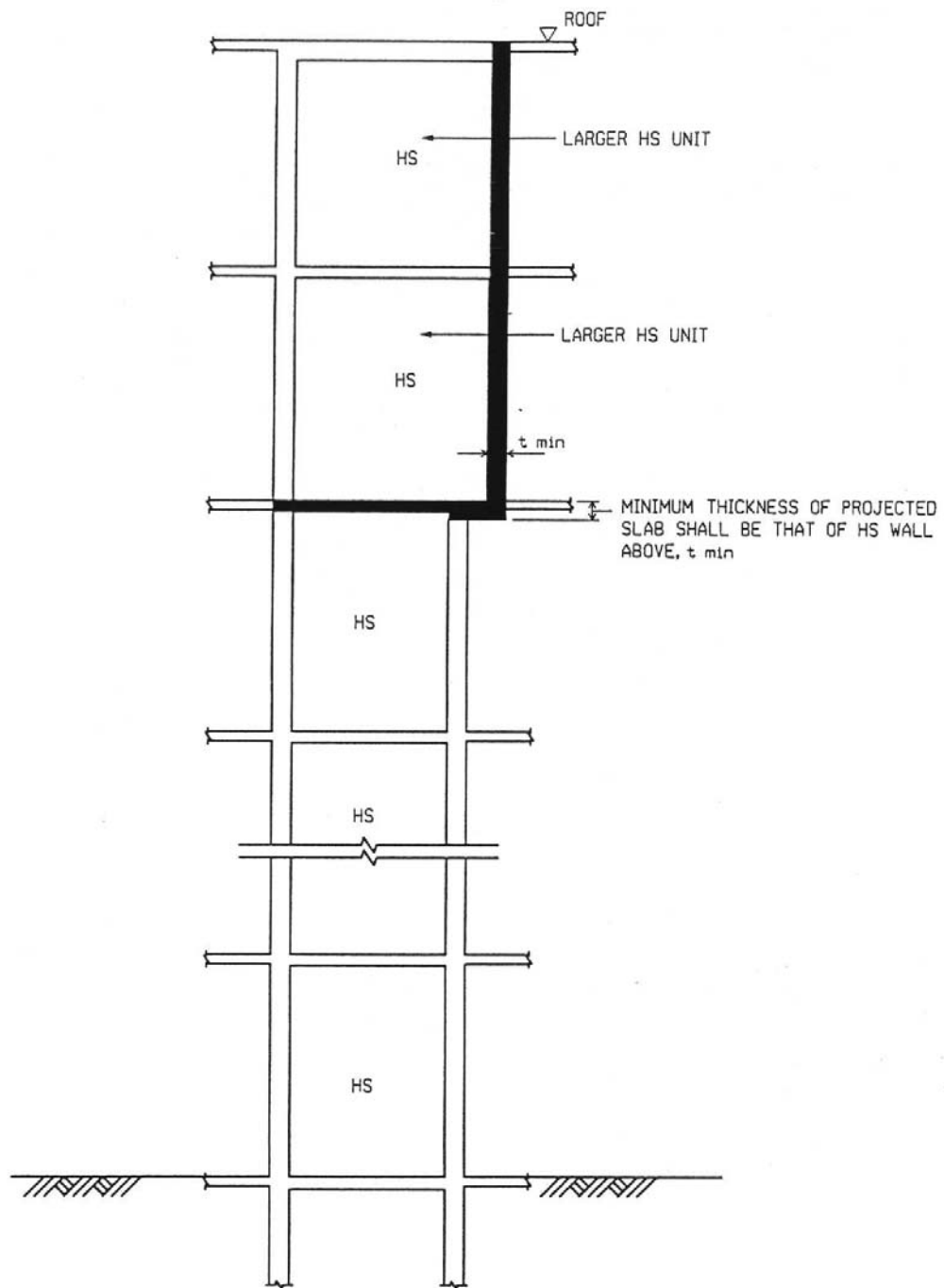


FIGURE 2 : PROJECTED HS FLOOR SLAB FOR LARGER HS ABOVE

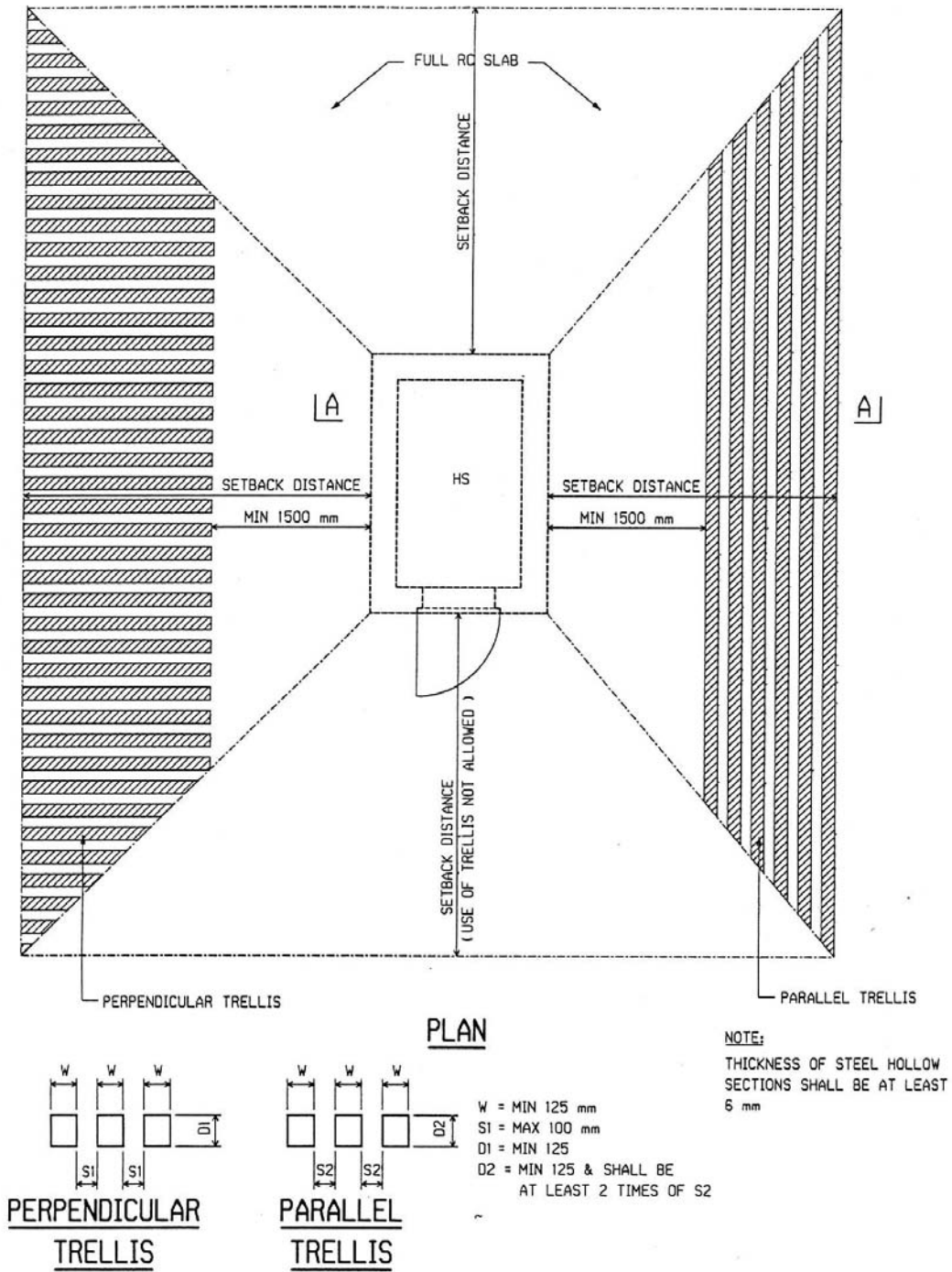
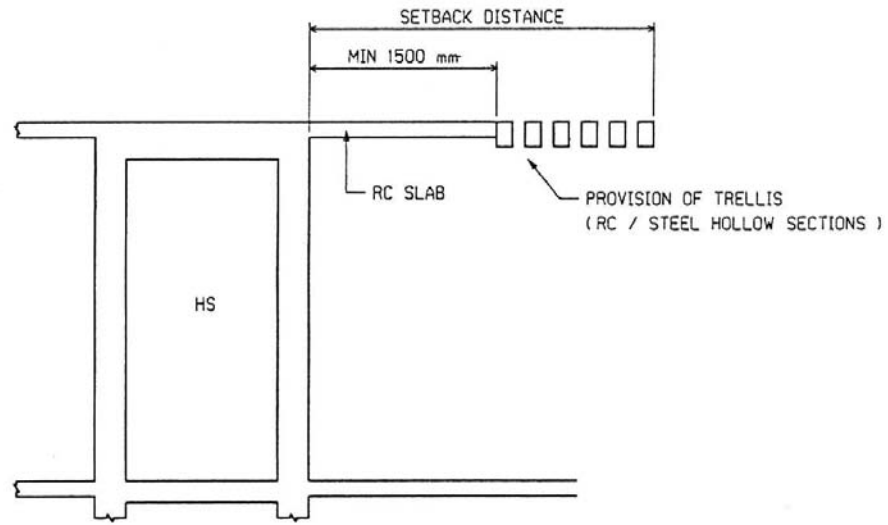


FIGURE 3(a) : USAGE OF TRELLIS (RC / STEEL HOLLOW SECTIONS) TO MAKE UP FOR SHORTFALL IN SETBACK DISTANCE



SECTION A - A

FIGURE 3(b) : USAGE OF TRELLIS (RC / STEEL HOLLOW SECTIONS)
TO MAKE UP FOR SHORTFALL IN SETBACK DISTANCE

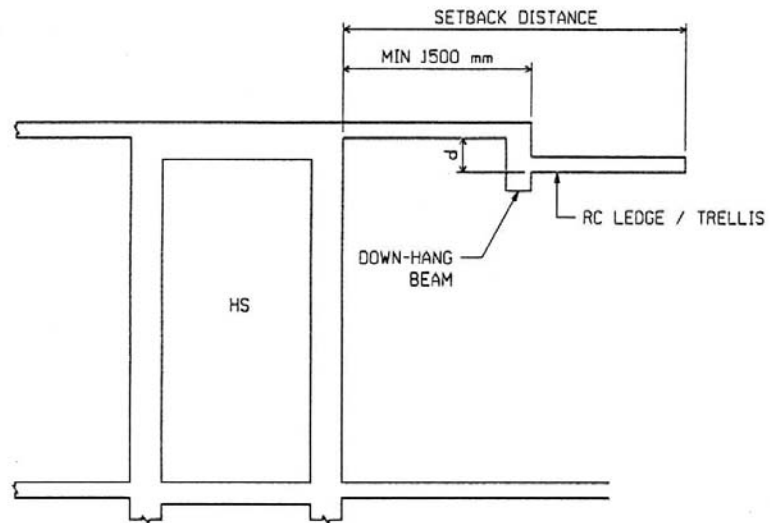


FIGURE 4 : DOWN-HANG BEAM NOT LOCATED ALONG
EXTERNAL BUILDING LINE

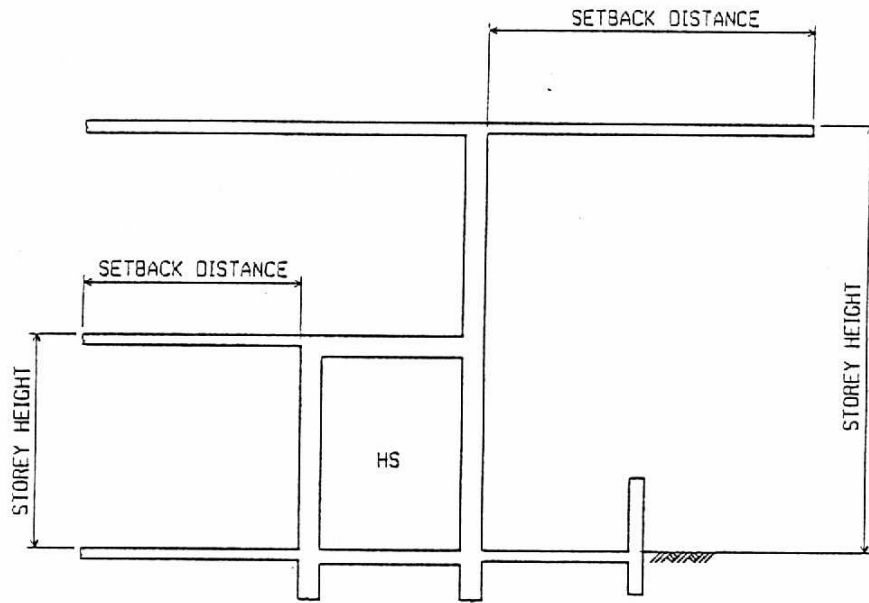


FIGURE 5 : HS WITH STOREY HEIGHT GREATER THAN 4000 MM

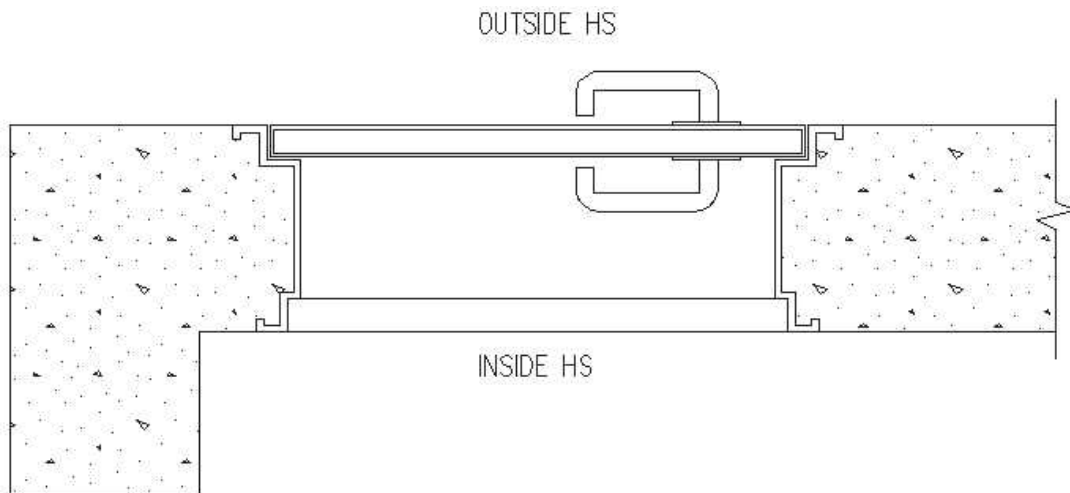


FIGURE 6 : SCHEMATIC EXAMPLE OF A DOUBLE REBATE DOOR FRAME/ JAMB