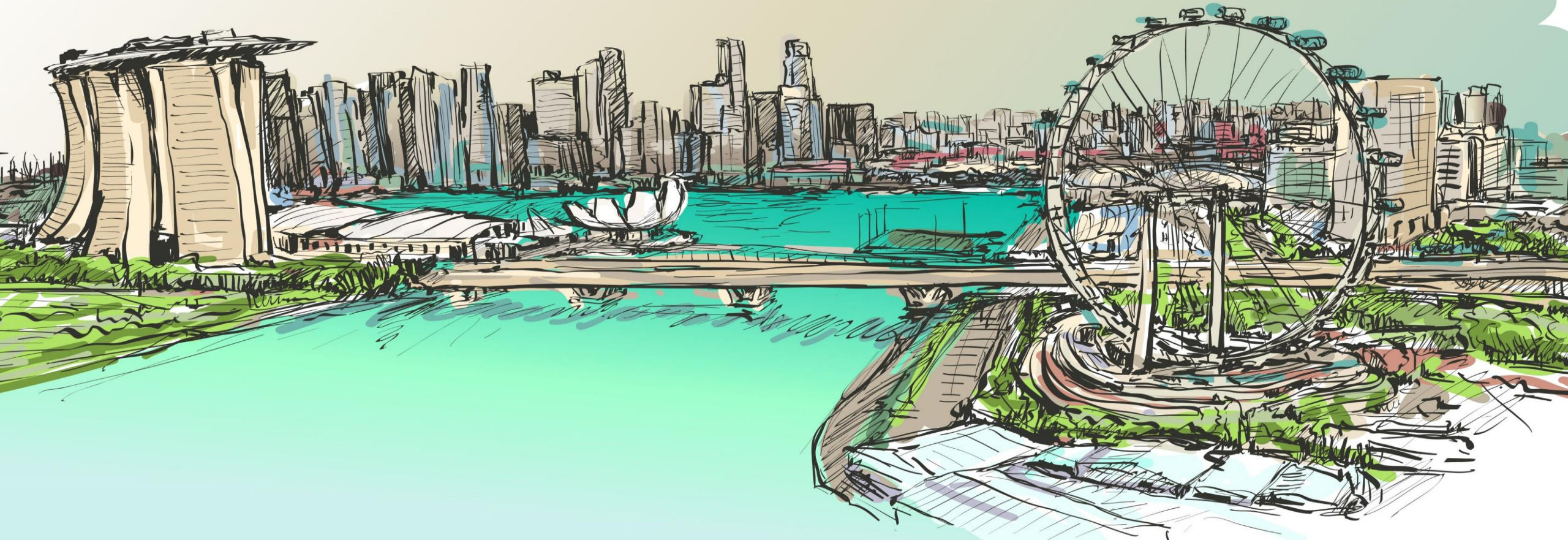


BCA Industry Sharing on BP/TOP Regulatory Updates 2024

Insights into Regulatory Compliance & Integrating Good Design Practices

7 May 2024



Introduction of Lodgement Scheme for Building Works under BC Act

TAN JING YING

Senior Engineer

CORENET X PROJECT OFFICE
BUILDING PLAN & MANAGEMENT GROUP



CONTENT

| | |
|----|---|
| 01 | Background |
| 02 | BCA Lodgment Process and Criteria |
| 03 | Deviation / Departure from Earlier Lodged Plans |
| 04 | Other Requirements under Building Control Act |
| 05 | Good Practices and Common Non-Compliances |



BACKGROUND

- **Before the introduction of Lodgment Scheme**

- Building works either require full approval or do not require approval at all
- There is no differentiated approach to deal with lower-risk building works

- **New Lodgment Scheme**

- Pro-enterprise approach in tandem with the launch of CORENET X
- Facilitate a simplified regulatory plan approval process for building works identified to be less complex and lower-risk

| FIRST SCHEDULE | NINTH SCHEDULE |
|---|--|
| INSIGNIF | Regulation 3B |
| 1. Building works carried out for or in connection v | PART 1 |
| (a) site formation works involving any excavat | LODGMET WORKS |
| (b) any shaft, manhole, trench or tunnel for the not exceed 1,000 millimetres in internal d other building works that are not specified | 1. Any single storey detached non-residential building, if — |
| (c) any boundary wall, boundary fence or gate | (a) the span of beam or roof trusses does not exceed 6 metres; |
| (d) any awning, windowhood or cantilevered millimetres; | (b) the span of any cantilever does not exceed 3 metres; |
| | (c) the height of the building does not exceed 6 metres; and |
| | (d) the building works do not involve any excavation works exceeding 2 metres in depth. |
| | 2. Foundation and supporting frames for gantry cranes, overhead cranes, jib cranes or monorail hoists that are independently supported, if — |
| | (a) the span of frame between 2 supports does not exceed 6 metres; and |
| | (b) the span of any cantilever supporting frame does not exceed 3 metres. |
| | 3. Any single level platform, if — |

Differentiation from First Schedule (IBW)

Unlike IBWs, QPs are required to lodge the plans with the CBC **for records and audits**



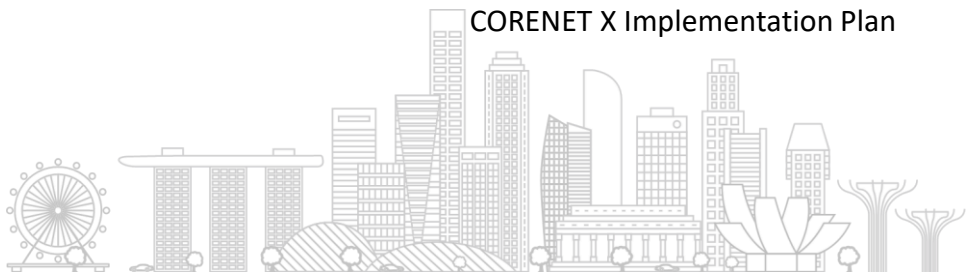
BCA LODGMENT PROCESS

Circular issued on 22 Dec 2023

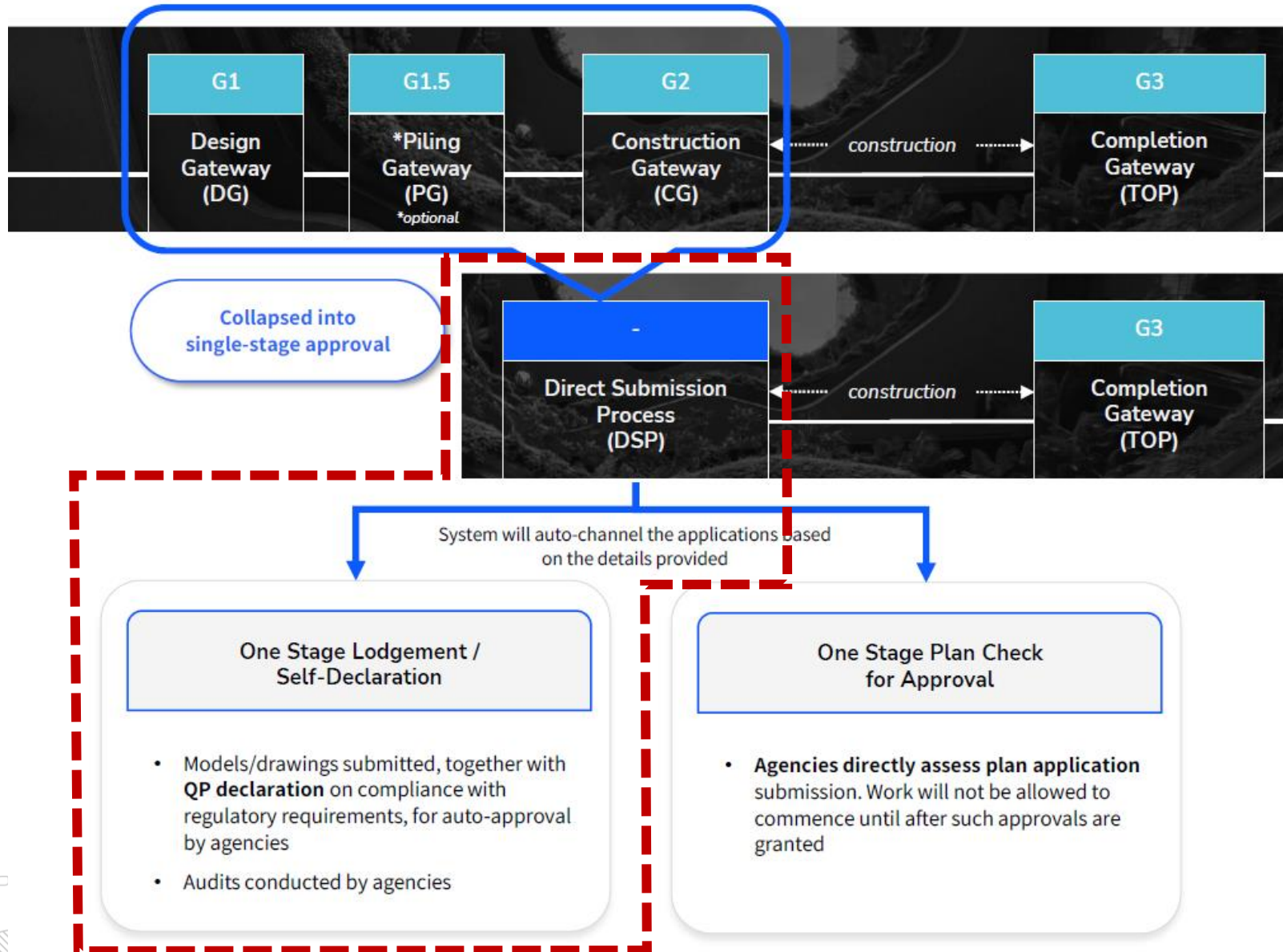
- BCA Lodgment Scheme is implemented in tandem with CORENET X roll-out
- BCA Lodgment Scheme is available as part of the Direct Submission Process under CORENET X

| Phased Onboarding | Date | Requirements |
|-------------------------|--|------------------------------------|
| New Projects | | |
| Soft Launch | 18 Dec 2023 | Please refer to para 3 to 6 |
| Voluntary Submission | 1 Jun 2024 | |
| Mandatory Submission | 1 Apr 2025 | |
| Ongoing Projects | | |
| Mandatory Submission | 1H 2026 <i>(exact date to be announced later)</i> | Please refer to para 11 |

CORENET X Implementation Plan



Direct Submission Process



DIRECT SUBMISSION PROCESS

Project will go through the following steps under Direct Submission Process

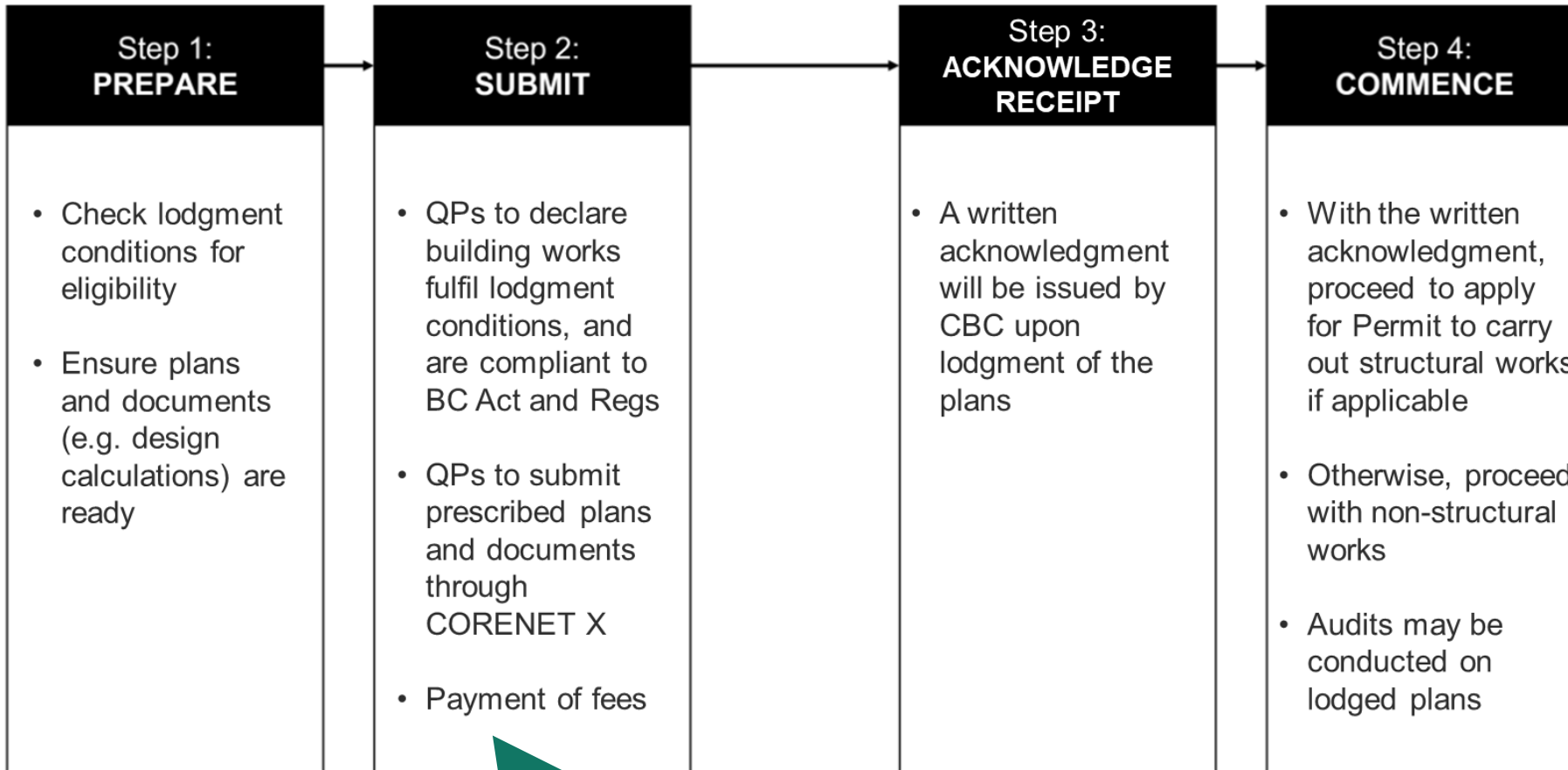
| | |
|---------------|---|
| Step 1 | Create project account and submission in CORENET X |
| Step 2 | Go through a set of eligibility questions |
| Step 3 | System will identify the appropriate submission scheme under each agency If project fulfils BCA's lodgment criteria and requirements, project is eligible for BCA lodgment scheme |
| Step 5 | QP(s) will then be guided to fill in the application form. |
| Step 6 | Declaration(s) by respective QP(s) & Complete payment |

Important Note

- BCA Lodgment DOES NOT exempt any building works from regulatory approvals of other agencies.
- As with any other submission on CORENET X, QPs are required to make **coordinated submission** under CORENET X. Submission will then be routed to all relevant agencies.
- If the project falls under lodgment, lodgment letter from the respective agencies will be issued once in order, while the submission may still be under review by other agencies.



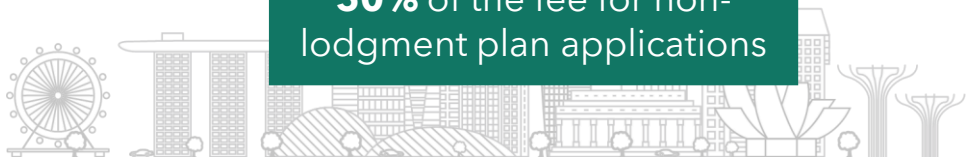
BCA LODGMENT PROCESS



Lodged Plans under Building Control Act

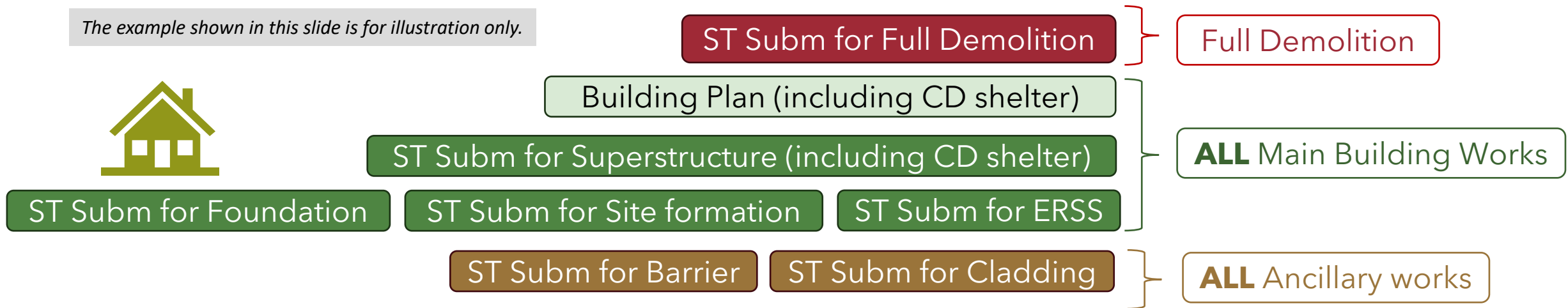
- Include, where applicable:
- a) Building plans (inclusive of CD shelter)
 - b) Detailed structural plans (inclusive of CD shelter) and design calculations
 - c) Site formation plans and pile layout plans
 - d) Demolition works plans

BCA's Lodgment fees are **50%** of the fee for non-lodgment plan applications



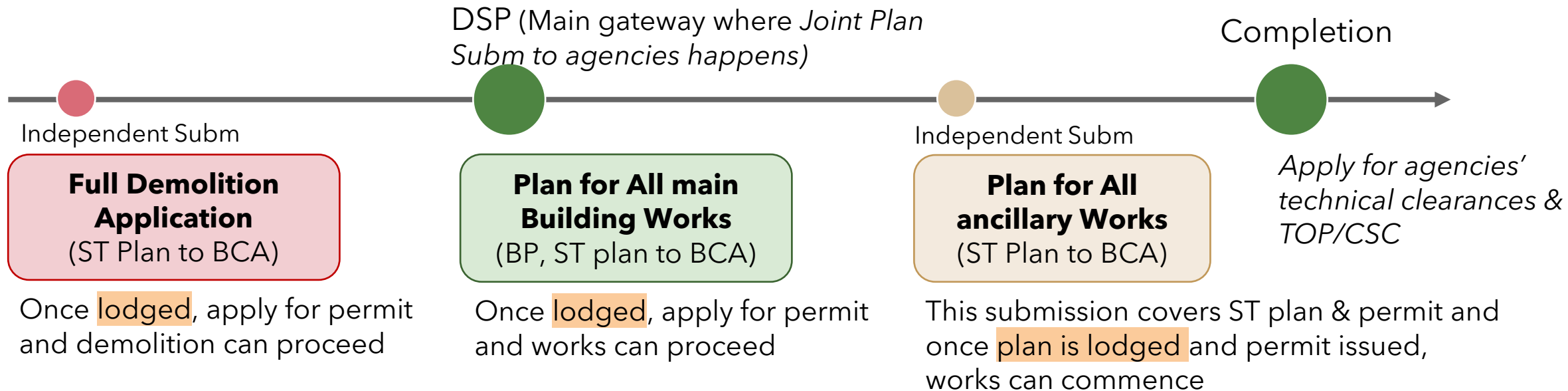
Lodgment of plan to BCA

The example shown in this slide is for illustration only.



Direct Submission Process

(following diagram only illustrates how the various plans required to be submitted to BCA should be made)

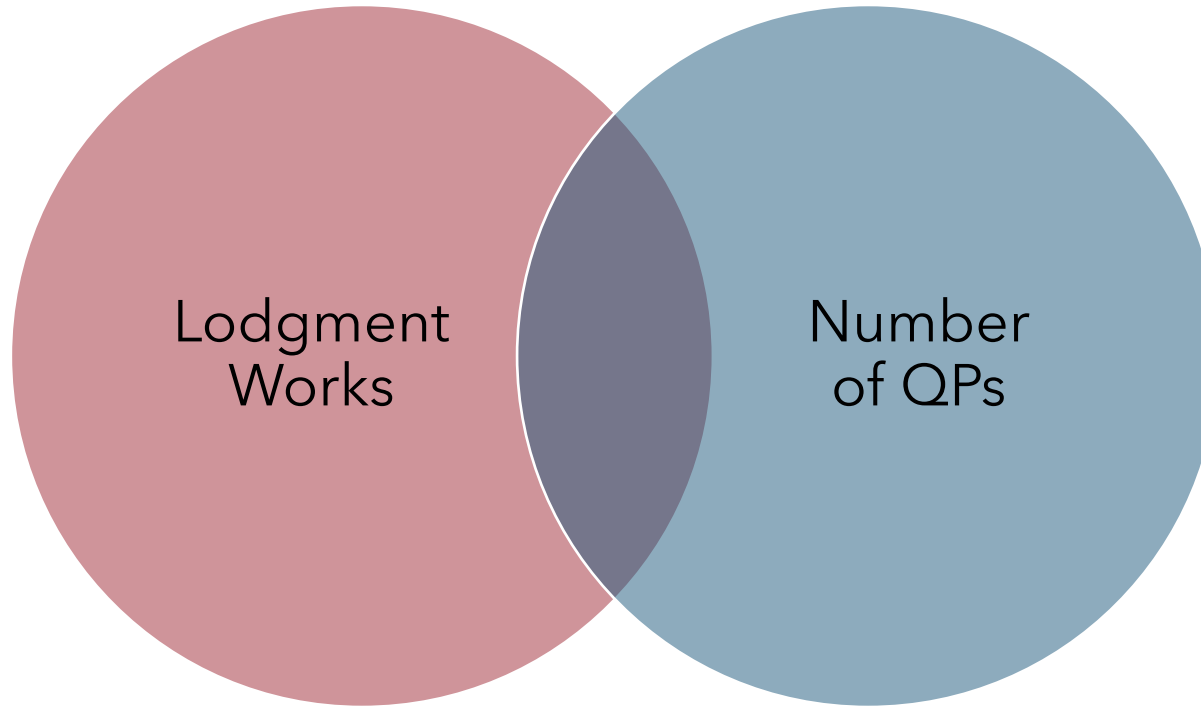


BCA LODGMENT CRITERIA

Satisfy conditions stipulated in **Ninth Schedule** of Building Control Regulations 2003

(a) Simple and Standalone structures (e.g. linkway, bus stop)

(b) Residential landed development built by private homeowner for own stay



1 QP(BP)
1 QP(ST) for all ST submissions

Architectural works = building works other than structural works, geotechnical building works, fixed installation works and works relating to mechanical or electrical installations in buildings



BCA LODGMENT WORKS (NINTH SCHEDULE OF BC REGS)

01 Simple/Standalone Structures

| S/N | Types of Work | All conditions to be fulfilled |
|-------|---|---|
| 1 | Single storey detached non-residential building | (a) Span of beam or roof trusses $\leq 6\text{m}$ (b) Span of any cantilever $\leq 3\text{m}$ (c) Height of the building $\leq 6\text{m}$ (d) Does not involve any excavation works $> 2\text{m}$ depth |
| 2 | Foundation and supporting frames for gantry cranes, overhead cranes, jib cranes or monorail hoists that are independently supported | (a) Span of frame between 2 supports $\leq 6\text{m}$ (b) Span of any cantilever supporting frame $\leq 3\text{m}$ |
| 3 | Single level platform | (a) span of frame between two supports $\leq 6\text{m}$ (b) Span of any cantilever $\leq 3\text{m}$ (c) Height of the platform above adjoining ground or floor level $\leq 4\text{m}$ (d) Area of the platform $\leq 100\text{m}^2$ |
| 4 | Staircase, ladder or similar device | Used solely for providing access to the single level platform described in item 3 |
| 5 | Site formation works (whether or not temporary or permanent) | (a) $1.5\text{m} < H \leq 4\text{m}$ (b) Average gradient of the slope from crest to toe < 22 degrees (c) No presence of soft soils (SPT N ≤ 4) beneath the slope (d) All existing structures, building works or other slopes located within the site of the site formation works must be located at a distance of $> 2H$ away from the crest or toe of the slope (H = height of the slope) |
| 6 | Replacement or reinstatement of a safety barrier integrated with a window | In any detached house, semi-detached house, terraced or linked house for residential purposes ≤ 3 storeys |
| 7 | Installation, replacement or reinstatement of any glass panel | (a) the glass panel is located at a height $\geq 2.4\text{m}$ (b) the glass panel is not installed as part of an exterior feature of any building (c) the glass panel is not used as a safety barrier against falling from a height |
| 8 (a) | Single storey pre-fabricated modular container | Area $\leq 35\text{m}^2$ |
| 8 (b) | Chimney, light mast or the like | Height $\leq 20\text{m}$ |

"container" means a box, tank or container of standard dimensions that (a) is generally used for the carriage of goods; and (b) is not constructed of short-lived materials.

BCA LODGMENT WORKS (NINTH SCHEDULE OF BC REGS)



02 Residential Landed (Owner-Built, Owner-Stay)

| S/N | Types of Work | All conditions to be fulfilled |
|-----|---|---|
| 9 | Any building works carried out for or in connection with any single unit detached house, semi-detached house, terraced or linked house for residential purposes | <ul style="list-style-type: none"> (a) The house \leq 3 storeys (b) The house is built by the owner for the owner's own use (c) Depth of any excavation works \leq 2m (d) Visible height of any retaining wall or earth retaining structure \leq 4m (e) Span of any cantilever \leq 6m (f) All key structural elements are constructed using only conventional material (g) No columns are subjected to tension forces (h) None of the following types of foundations are used: <ul style="list-style-type: none"> i. Shallow or spread foundation with the presence of soft soil (SPT N \leq 4) within the soil stratum; ii. Driven closed-ended piles iii. Jacked-in piles, or driven open-ended piles, which cross-section $>$ 200mm x 200mm, or diameter $>$ 200mm (i) Mitigation measures (such as relief holes or pre-boring) for the purposes of minimising soil disturbance to the surrounding buildings and other structures are taken before the installation of any jacked-in piles, or driven open ended piles, which cross section \leq 200mm x 200mm, or diameter \leq 200mm. |

"conventional material" means any reinforced concrete or structural steel but does not include any fibre reinforced concrete, pre-stressed reinforced concrete, aluminium and light gauge steel.



What happens when you have

DEVIATION/DEPARTURE FROM THE EARLIER LODGED PLANS

If the building works still satisfy lodgment criteria

Materials changes

QP to 're-lodge' the amended plans with prescribed lodgment fees

Any 're-lodgment' of amended plans will incur the same fee as a new lodgment submission

Immaterial changes

QP to submit as record plans, similar to current practices for non-lodgment building works

Building works are no longer lodgment works

Lodgment is no longer available and application for approval under Section 5 of BC Act is required



What happens after the plans are lodged?

OTHER REQUIREMENTS UNDER BUILDING CONTROL ACT

Commencement, Completion & Occupation

Requirements for construction supervision **remain unchanged**

Project team still needs to apply for permit to commence structural works, submit Record Plans & C-Forms upon completion

TOP/CSC process **remain unchanged**

Project is still required to obtain TOP/CSC
Technical clearances from relevant agencies are still required

01

Statutory Responsibilities

The statutory responsibilities of the developers, QPs, builders and site supervisors under the BC Act and BC Regulations **remain unchanged**.

02

Non-Compliances in Lodged Plans

- **Audits may be conducted** on lodged plans
- Non-compliance(s) or false declaration(s) are **offences under the BC Act and Regs**
- CBC may **refuse to accept any further lodgment** and direct plan application to be made under Section 5 of BC Act instead

03



What should QP take note of?

GOOD PRACTICES AND COMMON NON-COMPLIANCES

- As with non-lodgment plan application, QPs shall comply with all prevailing regulations and guidelines
- QPs should exercise caution and adopt good practices to **avoid downstream issues during construction and TOP/CSC**

Adequate site investigation

Suitable method of construction

Compliance with Household Shelter requirements

Adequate protection for neighbouring structures

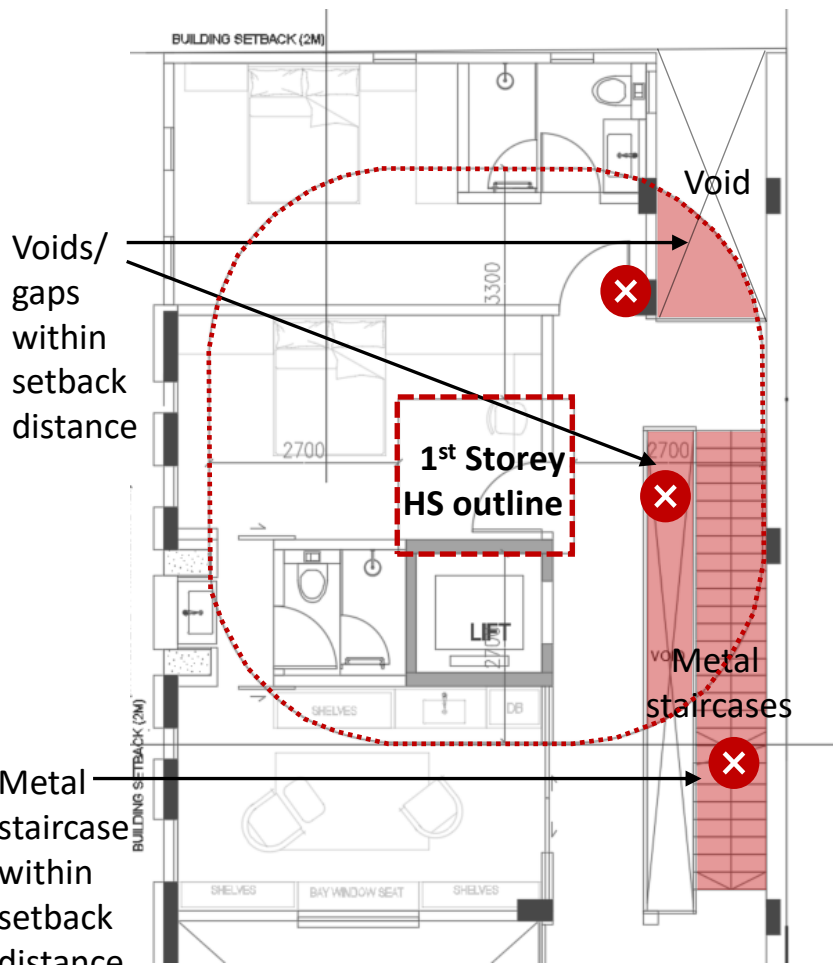


General Observation of Common HS Non-Compliance for Landed House

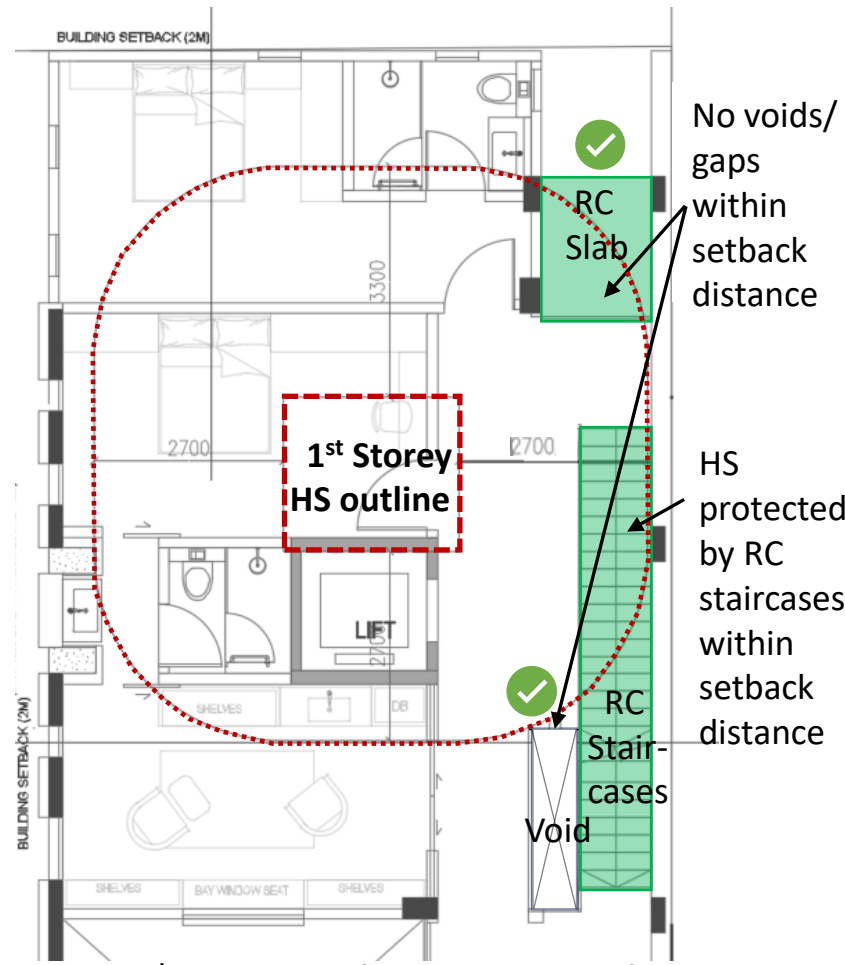
| S/No | Description |
|------|---|
| 1 | Non-compliance / Shortfall in Setback Distance |
| 2 | Wrong provision of Glass Skylight as Setback Distance |
| 3 | Insufficient Thickness of HS Wall abutting RC Lift Core |
| 4 | Piping cast in HS wall/slab is not allowed |
| 5 | Incorrect Position of Ventilation Sleeves |
| 6 | Incorrect Wall Thickness of HS under Staircase |
| 7 | Incorrect Storey Height to derive Setback Distance |



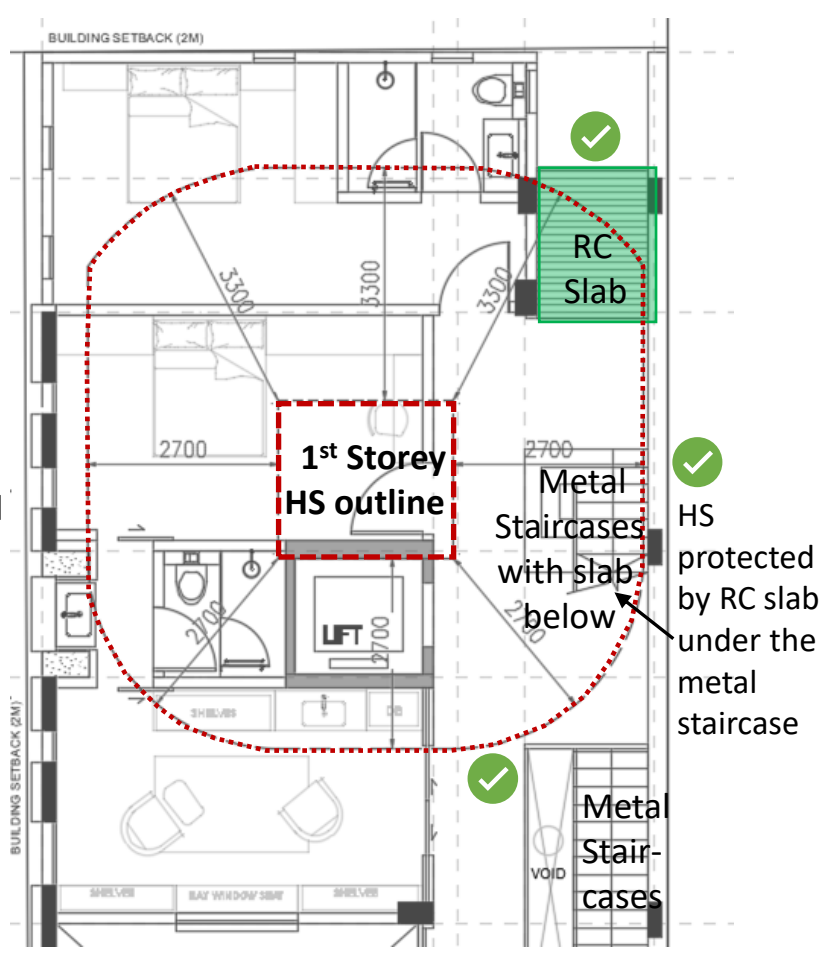
Non-compliance in Setback Distance



2nd Storey Plan (HS Storey Height)



2nd Storey Plan (HS Storey Height) (Option 1)



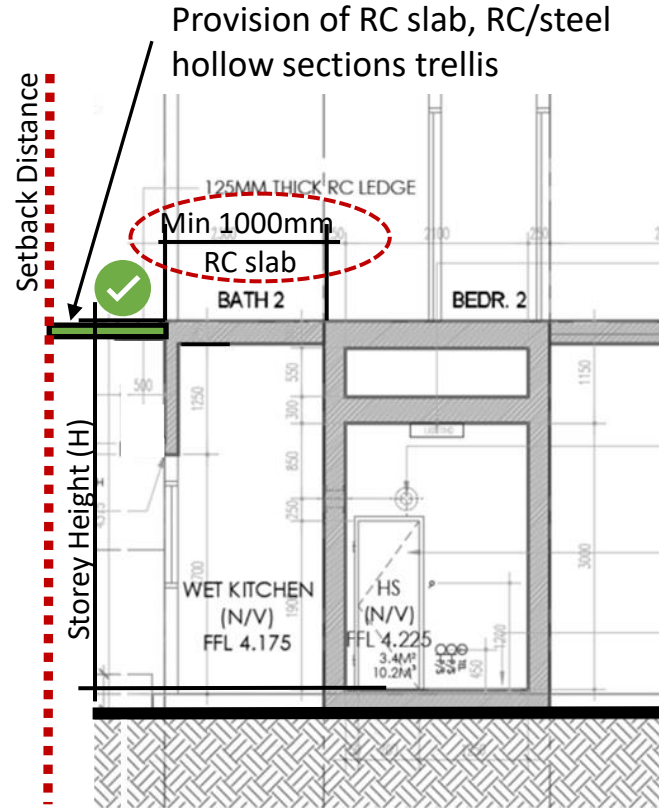
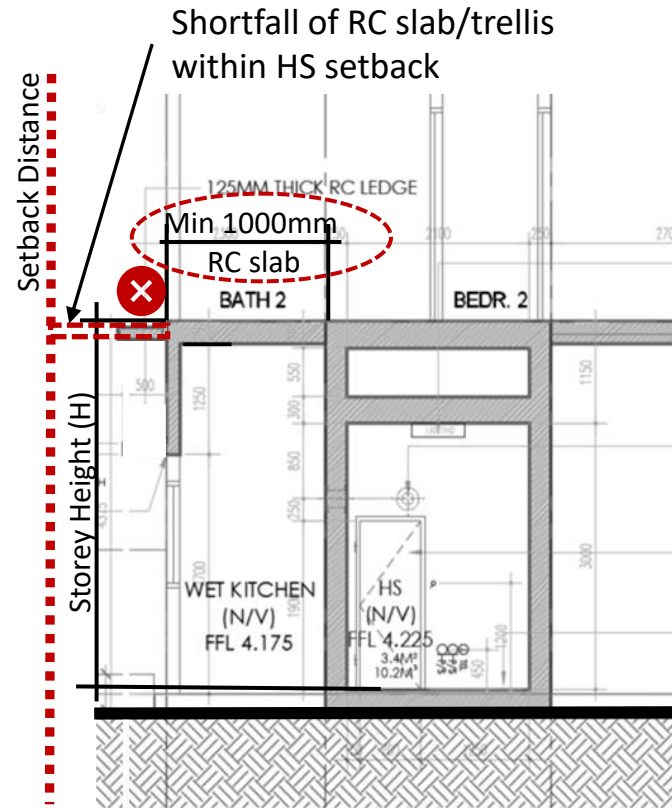
2nd Storey Plan (HS Storey Height) (Option 2)

X HS located at the 1st storey is not fully protected as there are voids/gaps and metal staircases within setback distance

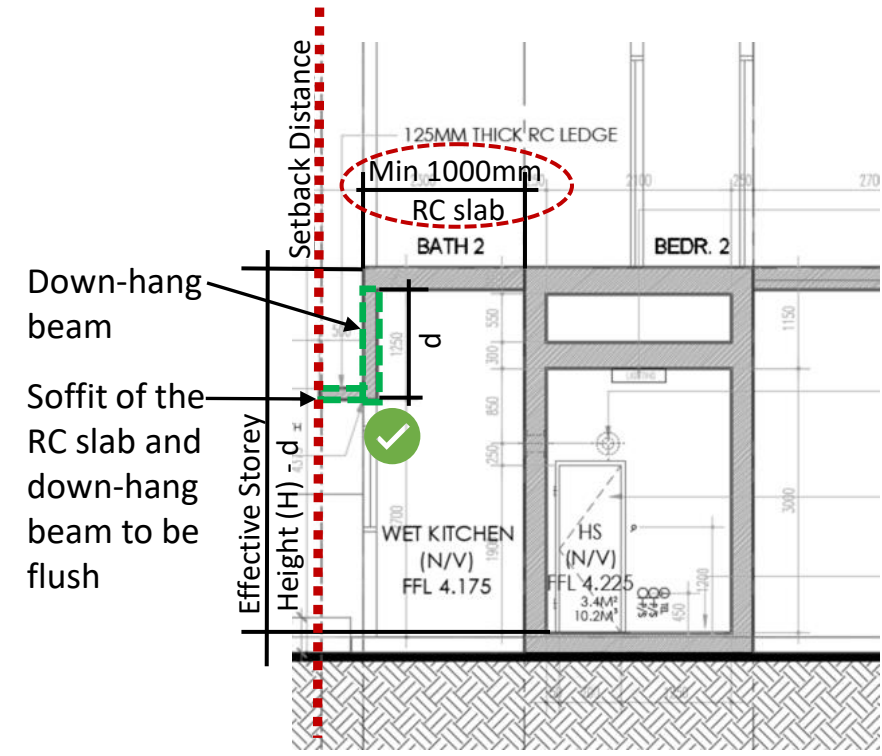
✓ HS located at the 1st storey is protected by RC slab and RC staircases within setback distance

✓ HS located at the 1st storey is protected by RC slab within setback distance

Shortfall in Setback Distance



Option 1



Option 2

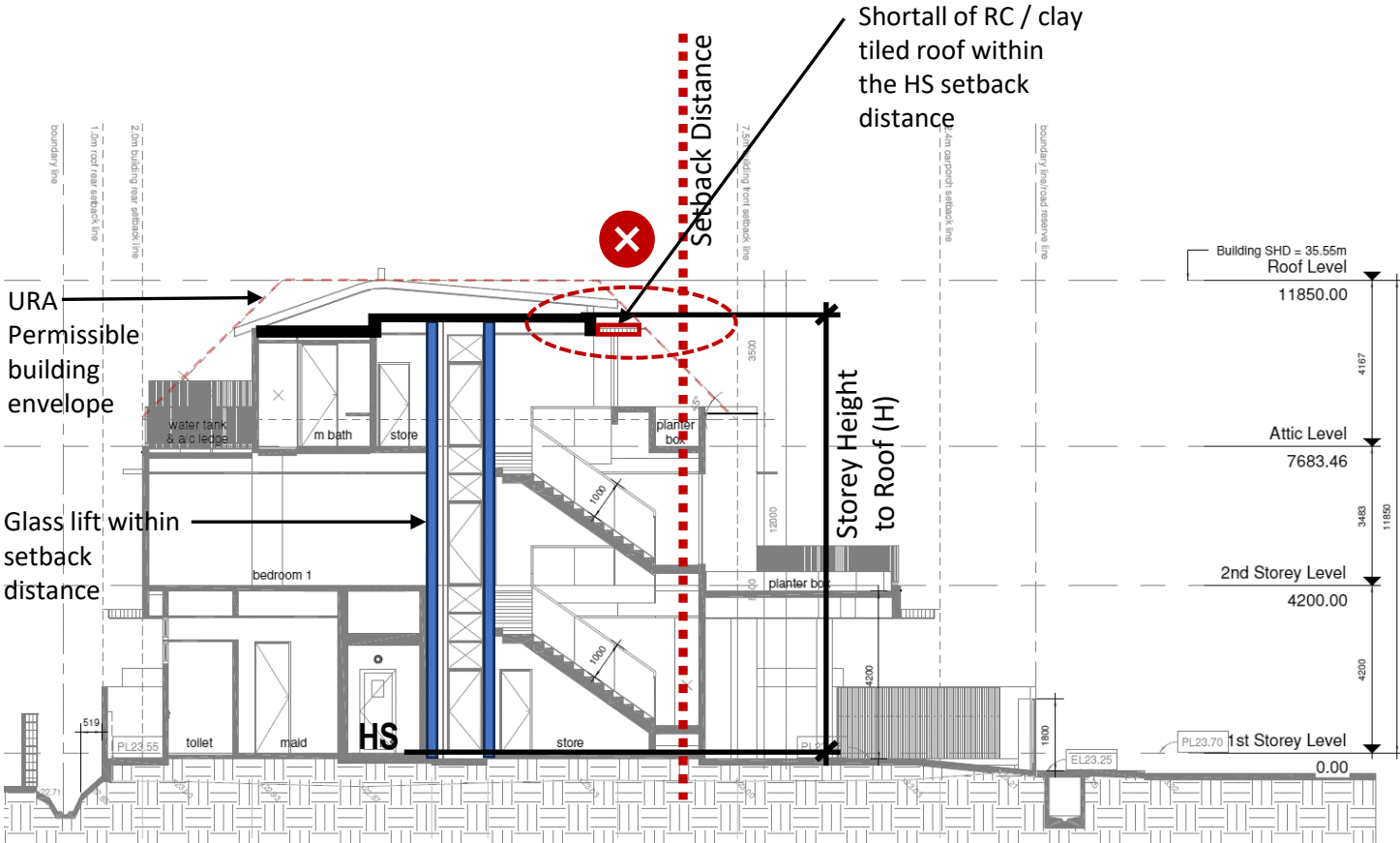
(Provision of Down-hang beam)

X HS not protected by RC slab, RC/steel hollow sections trellis within setback distance

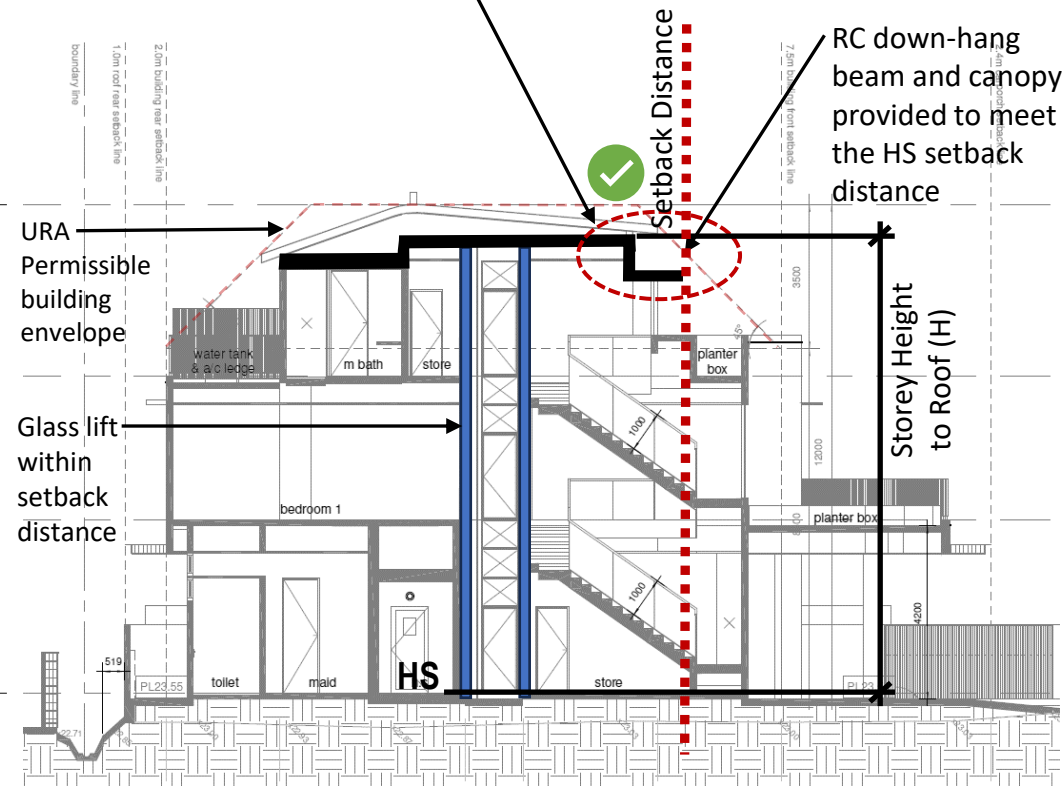
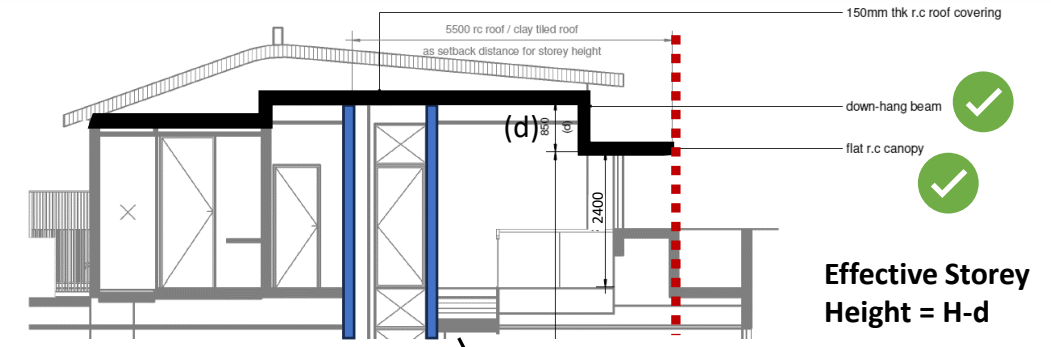
✓ Provision of RC slab, RC/steel hollow sections trellis within setback distance

✓ Soffit of the RC slab and down-hang beam flushed to reduce to effective storey height

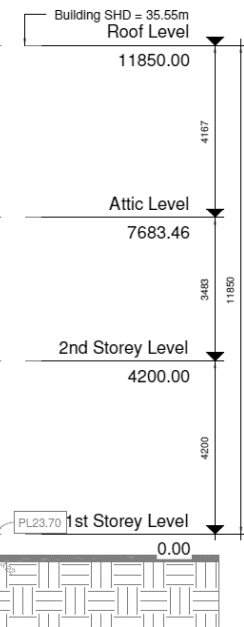
Shortfall in Setback Distance



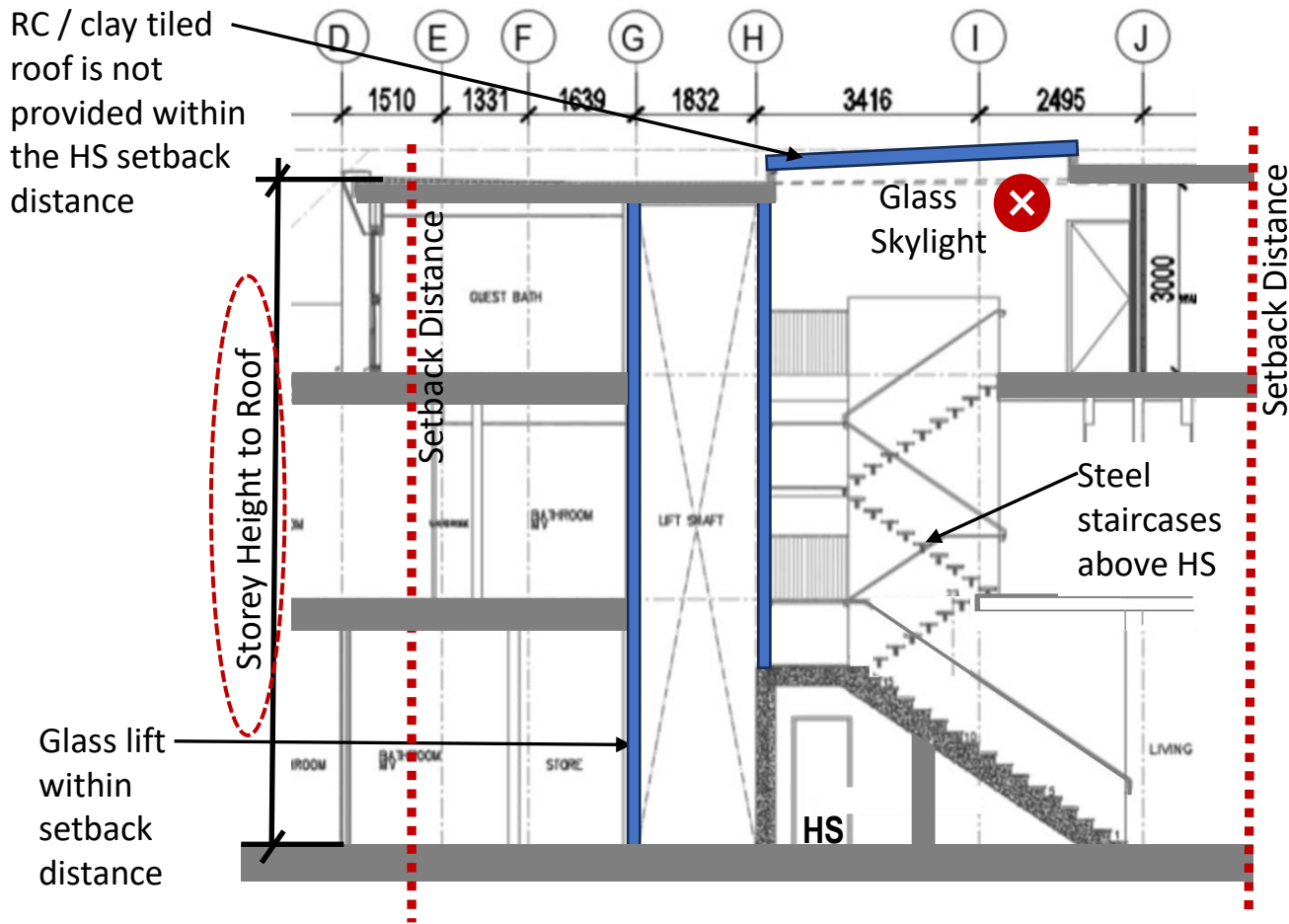
HS not protected by Reinforced Concrete (RC) roof/ clay tiled roof within setback distance.



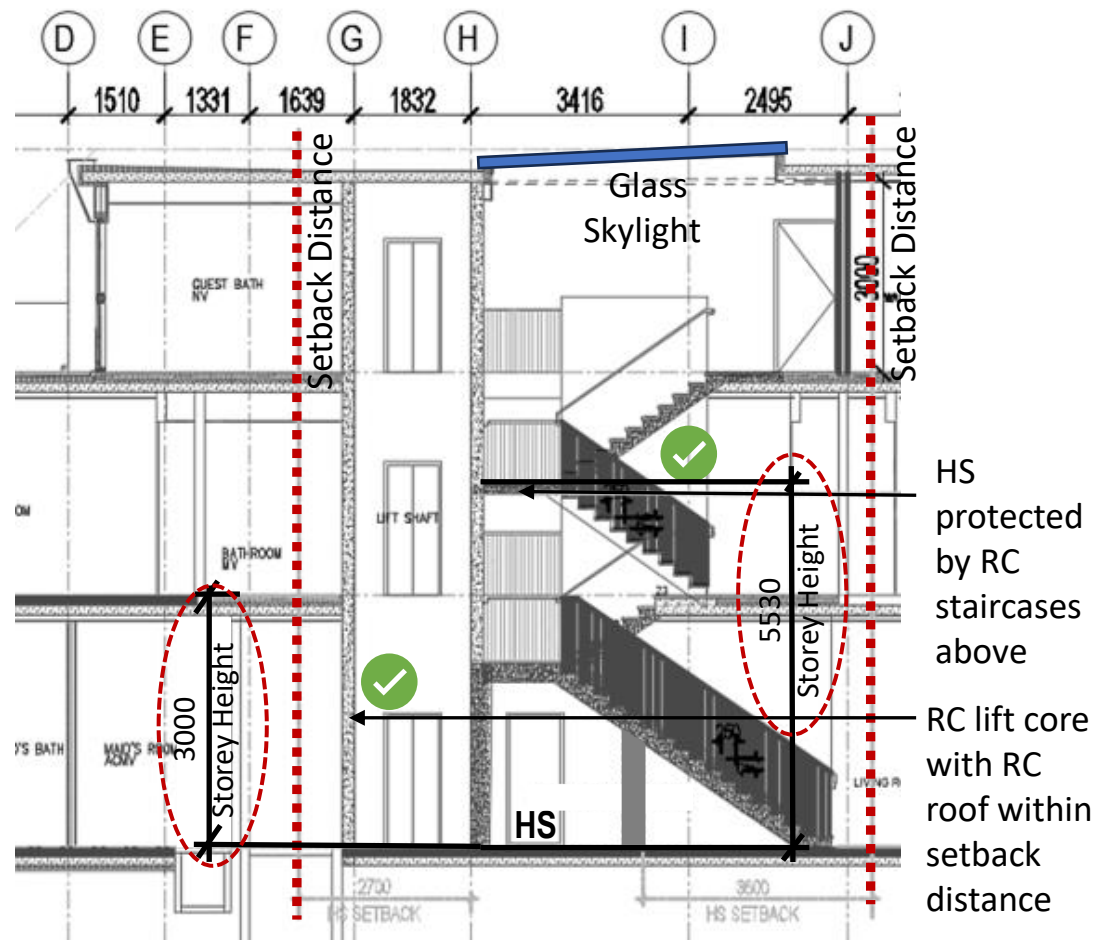
Down-hang beam and RC canopy provided to effectively reduce and meet the setback distance requirement.



Wrong provision of Glass Skylight as Setback Distance

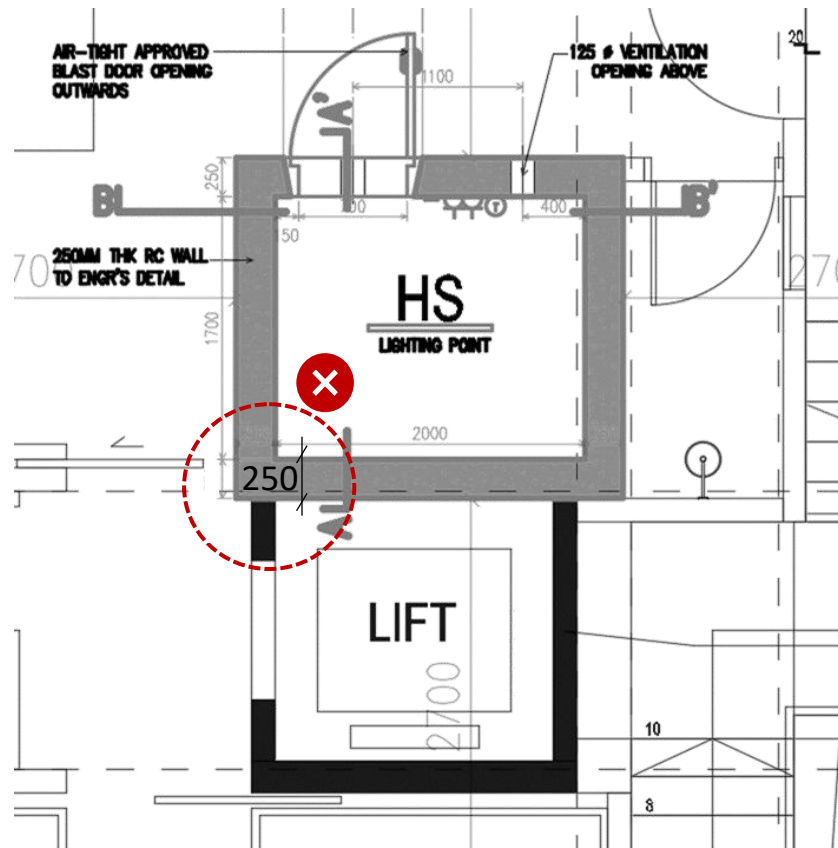


❌ HS not protected by Reinforced Concrete (RC) roof/ clay tiled roof within setback distance.

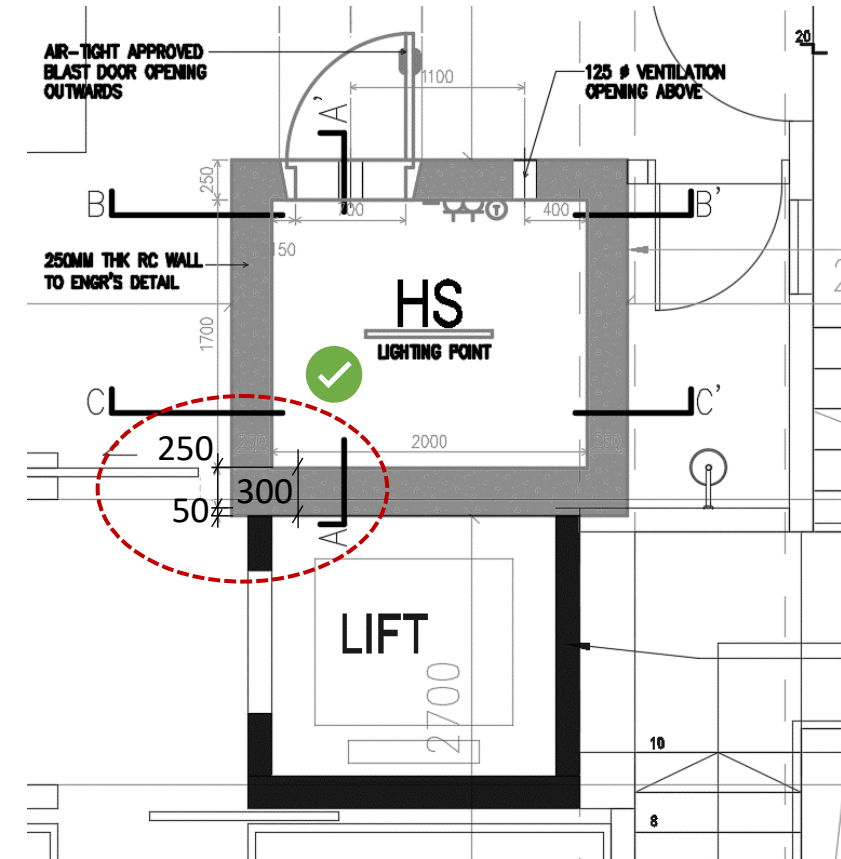


✅ HS protected by RC lift core with RC roof and RC staircase provided within the setback distance.

Insufficient Thickness of HS Wall abutting RC Lift Core

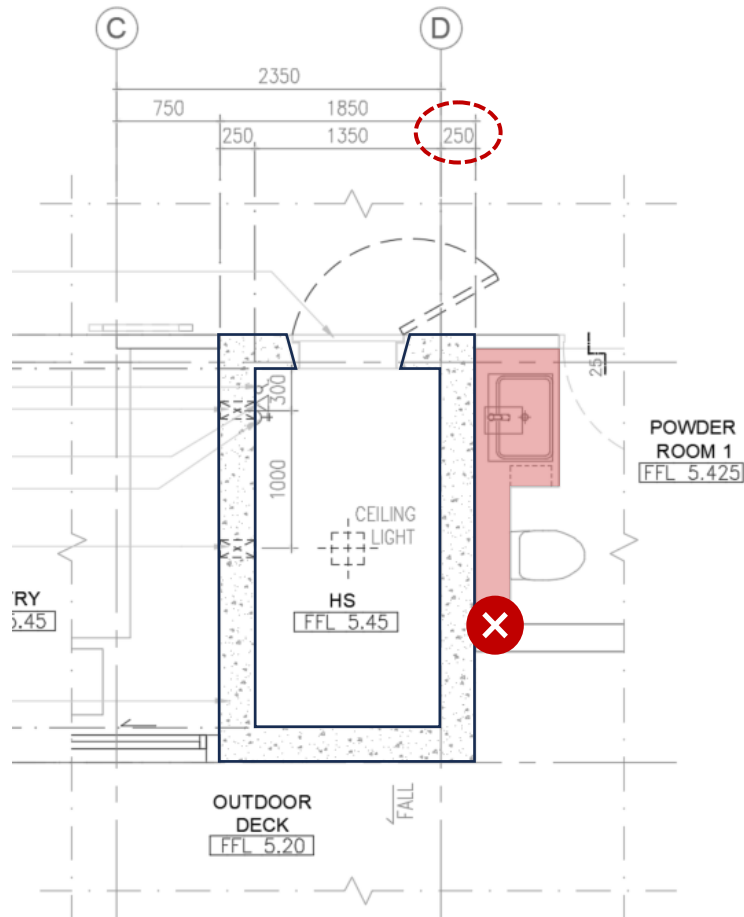



Additional 50mm thickness is not provided to the HS wall abutting RC lift core.

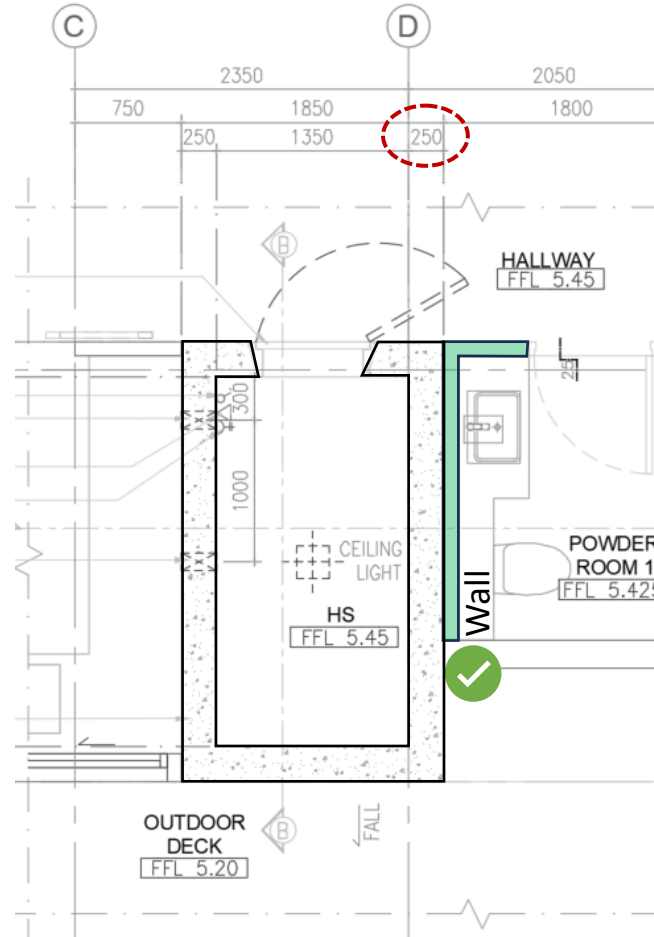



Additional 50mm thickness is provided to the HS wall abutting RC lift core.

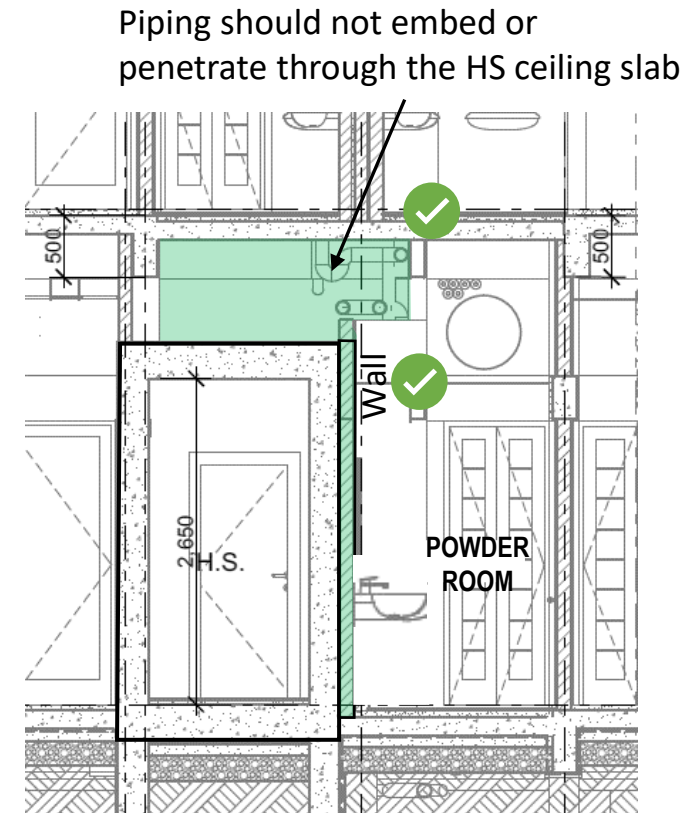
Piping cast in HS wall/slab is not allowed



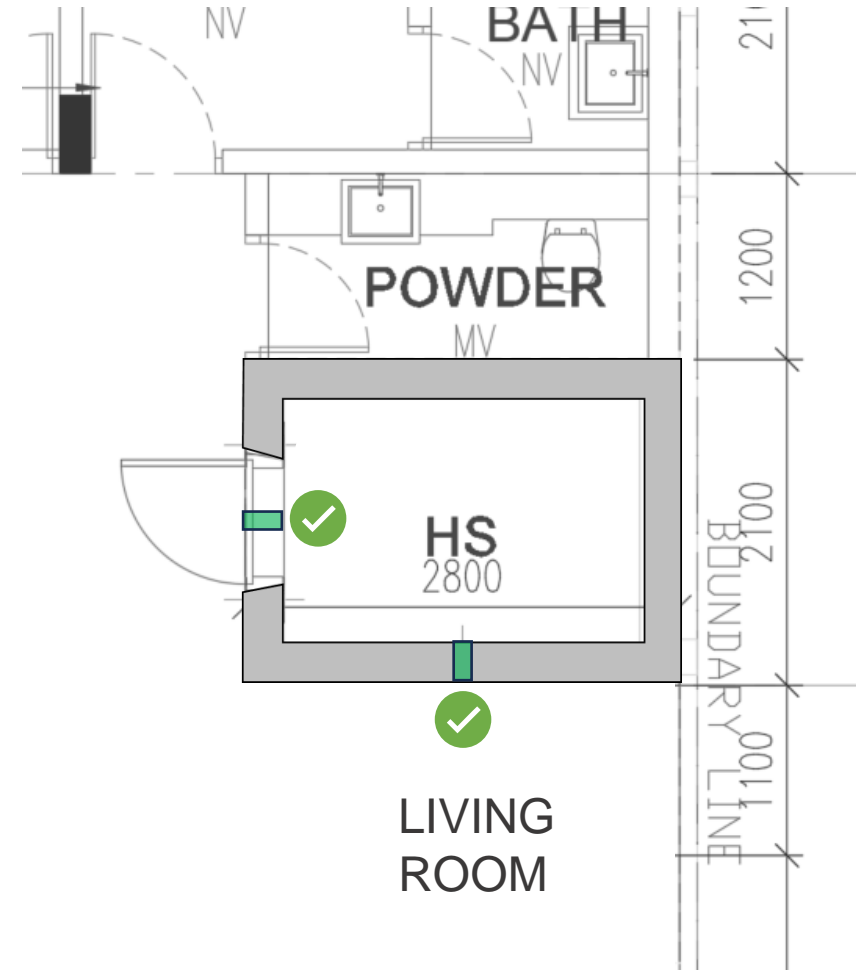
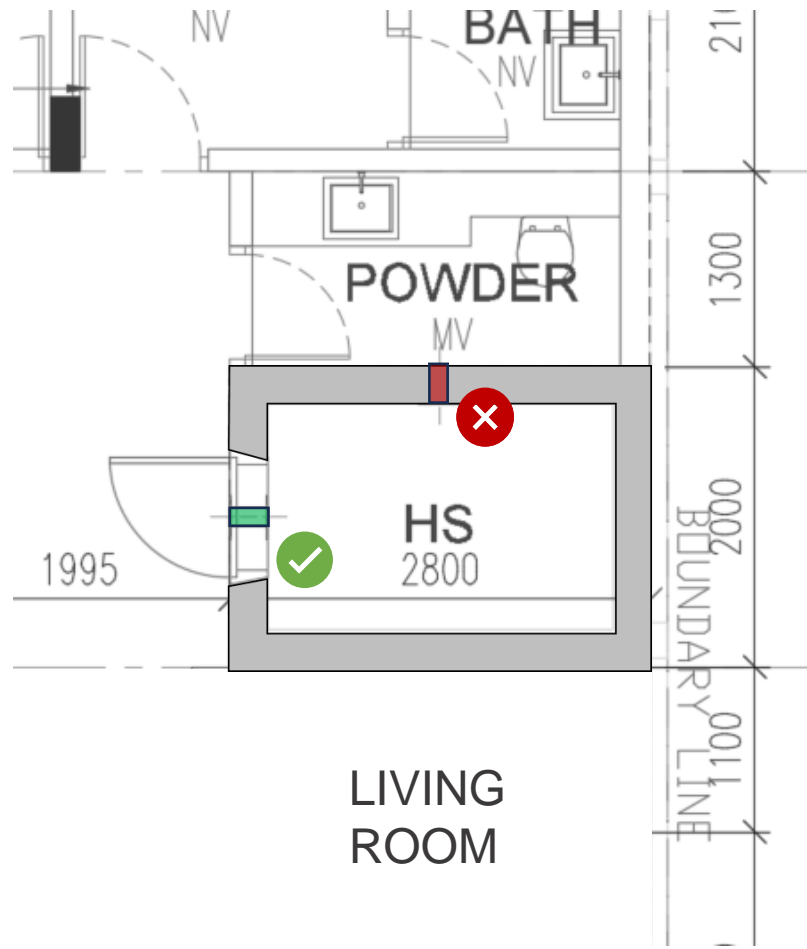
 Piping cast in HS wall/slab





 Wall provided next to the HS RC wall for piping.
Piping should not embed or penetrate through the HS ceiling slab.



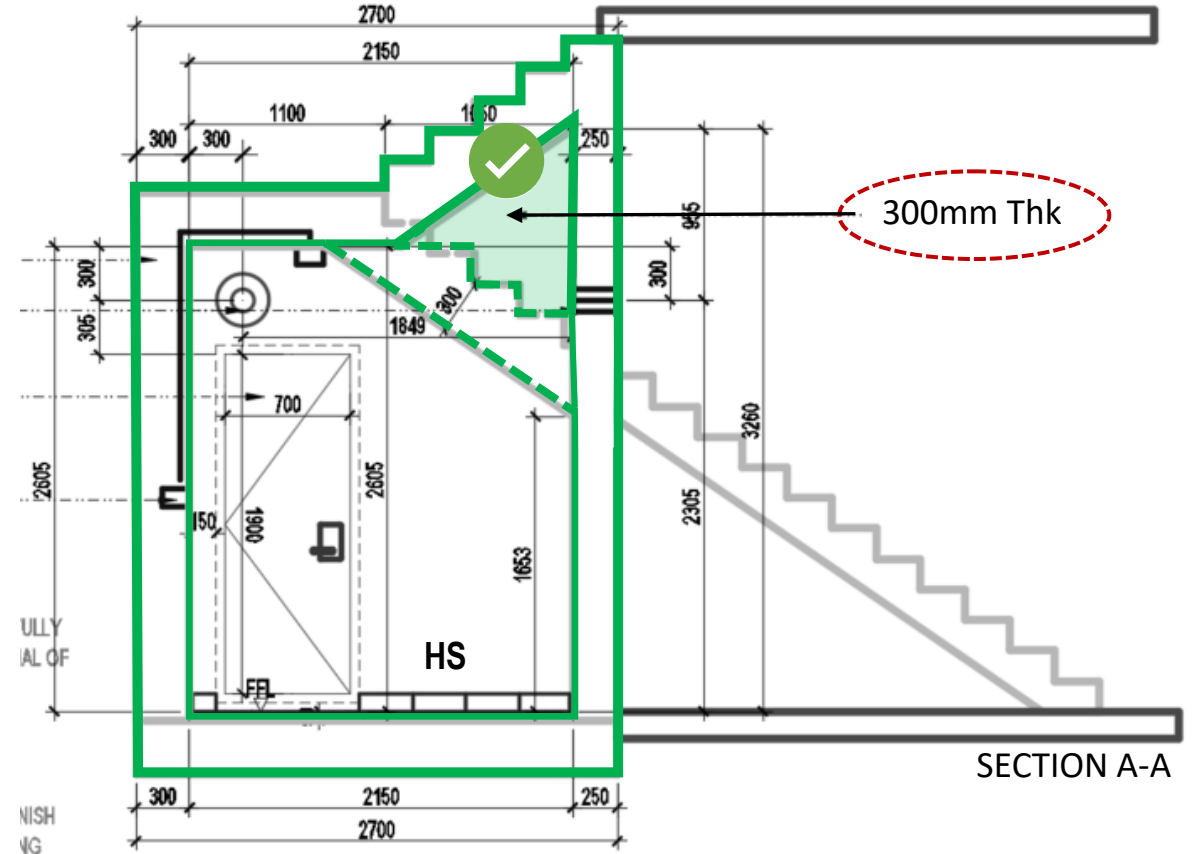
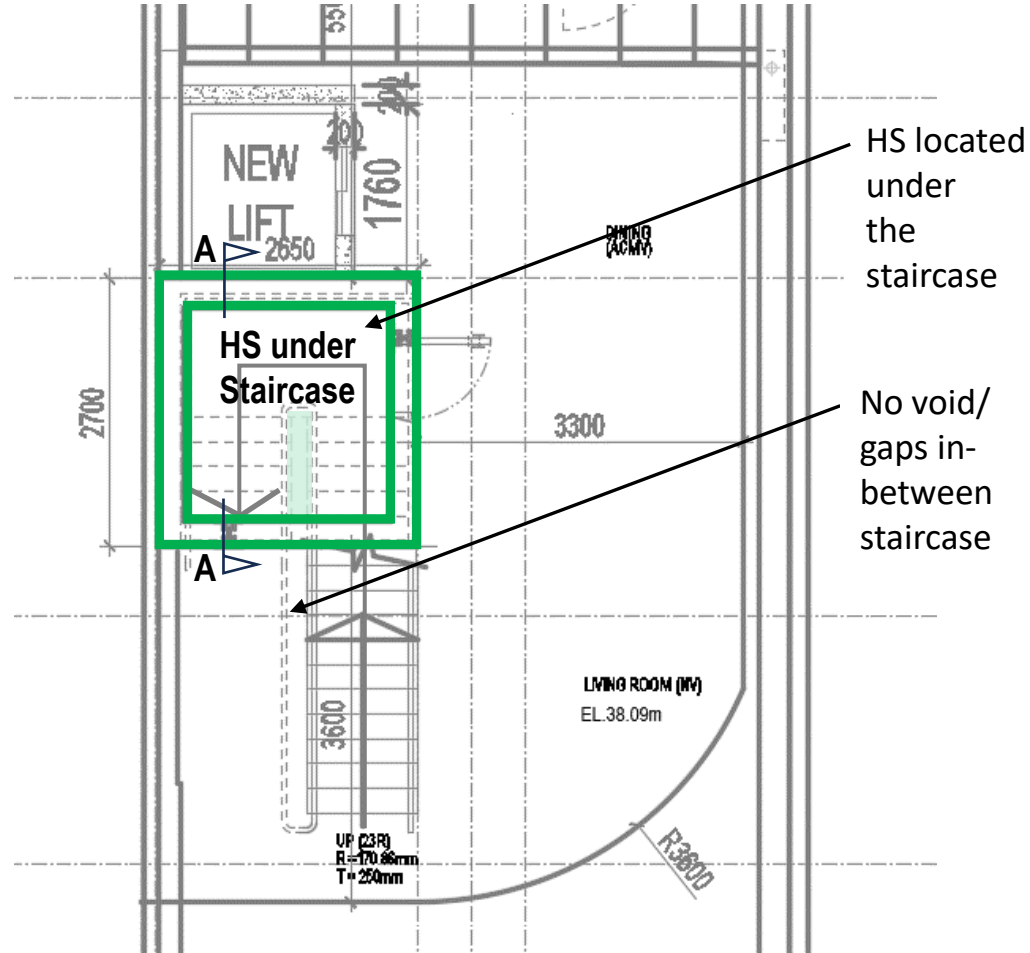
Incorrect Position of Ventilation Sleeves



 Ventilation sleeves located in areas such as toilets, bathroom.

 Ventilation sleeves located away from areas such as toilets, bathroom.

Incorrect Wall Thickness of HS under Staircase

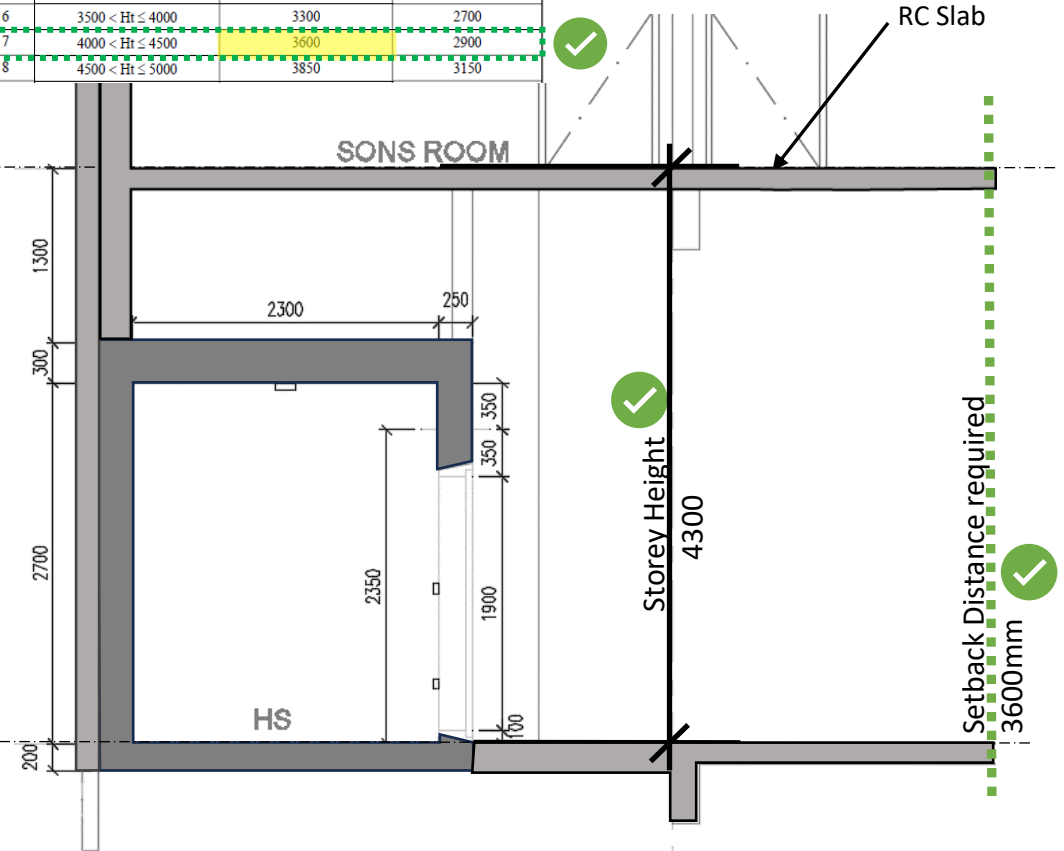
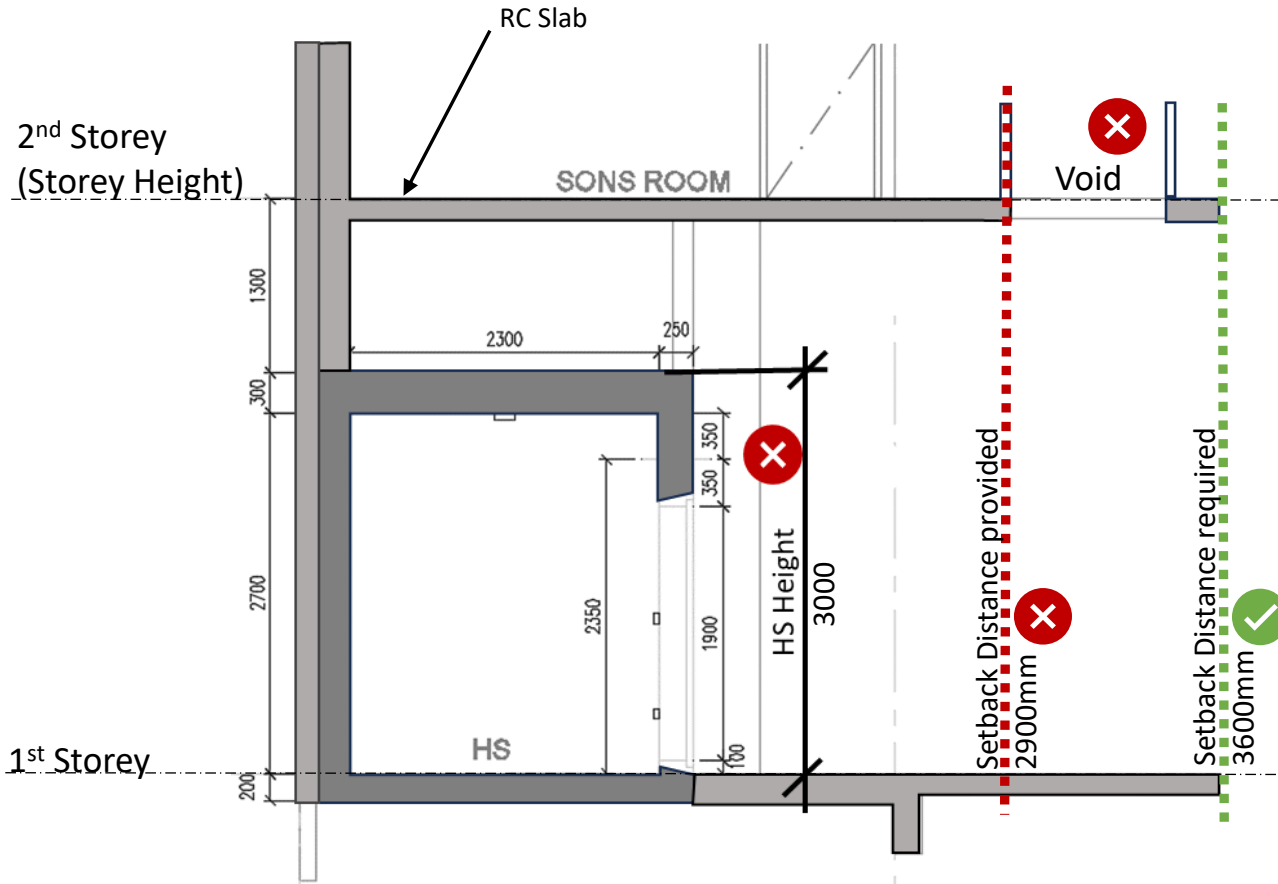


RC element forming part of the HS compartment shall have the same thickness as that required for the HS ceiling slab.

Incorrect Storey Height to derive Setback Distance

TABLE 2.4.3(a): MINIMUM SETBACK DISTANCES OF HS WALLS WITHOUT REINFORCED CONCRETE DOWN-HANG BEAM ALONG EBL

| S/No | Storey Height (mm) Column (1) | Setback Distance of HS Wall with HS Door (mm) Column (2) | Setback Distance of HS Walls without HS Door (mm) Column (3) |
|------|----------------------------------|---|---|
| 1 | 2500 ≤ Ht ≤ 2800 | 2750 | 2000 |
| 2 | 2800 < Ht ≤ 3100 | 2900 | 2200 |
| 3 | 3100 < Ht ≤ 3200 | 2950 | 2300 |
| 4 | 3200 < Ht ≤ 3400 | 3050 | 2400 |
| 5 | 3400 < Ht ≤ 3500 | 3100 | 2500 |
| 6 | 3500 < Ht ≤ 4000 | 3300 | 2700 |
| 7 | 4000 < Ht ≤ 4500 | 3600 | 2900 |
| 8 | 4500 < Ht ≤ 5000 | 3850 | 3150 |



✗ Storey height is incorrectly taken to the top of the HS. HS is not adequately protected due to presence of void within the required setback distance.

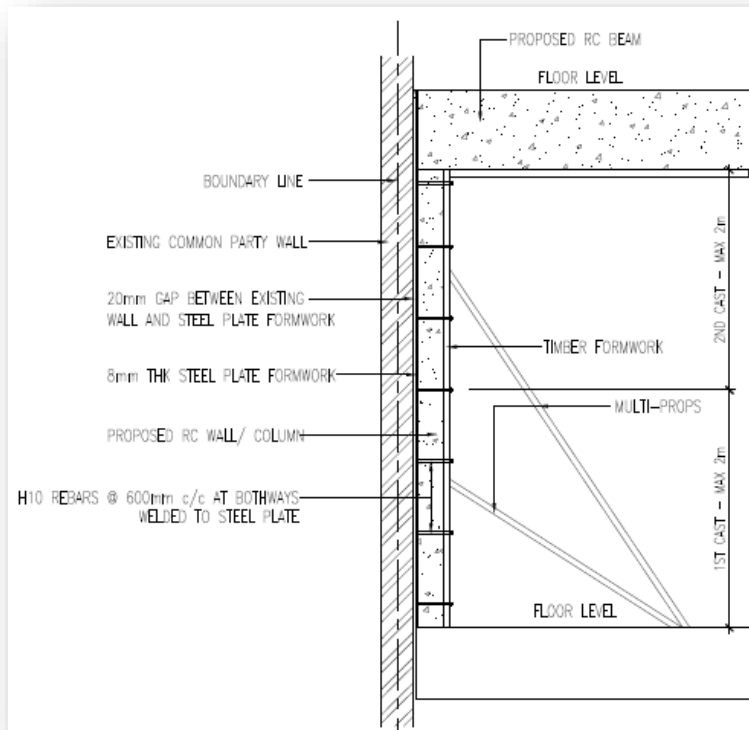
✓ Storey height is taken to the building storey height

Suitable Method of Construction

- No lateral force shall be imposed to the existing party or boundary brickwall during construction.
- QPs should **avoid placing large and continuous RC element** abutting existing party/boundary brick wall.
- If unavoidable, **provide formwork all round** for the casting and show the arrangement of formwork in the plans.



Example of partywall collapse during casting of new RC wall abutting it



Example of formwork details to be shown in the plans

Recent Incidents of Brickwall Collapse

In 2013, there were a spate of incidents involving brick party or boundary wall collapse during casting of adjacent new reinforced concrete (RC) walls. BCA had then alerted the industry on such incidents and a flyer on the incident cases between 2012-13 was disseminated to the builders and qualified persons (QPs). QPs were urged to look into the construction of the new RC walls abutting existing brick walls in landed projects during plan submission.

The number of such incidents have reduced but are still happening. We share some of these recent cases below and urged all QPs and builders to stay vigilant to prevent such cases from happening.

QPs and builders shall ensure that site supervisors and workers are briefed on the good practices and made aware that such incidents would cause damage to property and inconvenience to the occupants. It will also result in delay to project completion and large rectification cost.

Case 1 - December 2023, detached house

The builder was concreting a new concrete boundary wall of the detached house development when the incident occurred. This concrete boundary wall abuts to an existing brick boundary wall to the neighbouring property and part of this existing brick wall was used as formwork for the concreting of the concrete wall. A 12m length of the existing brick boundary wall gave way during the concreting works, and the wet concrete flowed into the side walkway of the neighbouring property. The brick boundary wall that gave way also dislodged two timber stanchions that supported a lean-to roof canopy of the neighbour's house.

The permit was revoked immediately. The additional rectification cost by the builder was estimated to be S\$23,000.

Case 2 - June 2023, terrace house

While carrying out concreting of the household shelter and lift RC wall along a segment of the common boundary at the first storey, the bottom of the formwork gave way and the wet concrete punched through the hollow block and partitioning of the neighbour's house.

The permit was revoked immediately, and the project was delayed for 3 ½ months. The additional rectification cost by the builder was about S\$55,000.

Case 3 - December 2022, semi-detached house

The builder was casting RC boundary wall against the gable end roof of the neighbour house. The gable end roof has a RC beam supporting the roof and brick wall below. The brick wall gave way during the casting and bricks and concrete debris fell onto the false ceiling of the neighbour house, damaging it and dropped to the staircase space below.

The permit was revoked immediately. The additional rectification cost by the builder was estimated to be S\$23,000.

BE/Feb 2024

Flyer on such incident cases that BCA has been sending to the industry

Adequate Protection for Neighbouring Structures

- Provisions shall be made to prevent damages to the neighbour, such as **adequate hoardings, waterproofing of exposed party wall** after demolition etc.
- These provisions are to be shown in the plans.



Example of applying cementitious material to waterproof the exposed un-plastered party wall immediately after demolition and the waterproofing provision is to be shown in the plans.

Adequate Site Investigation

- Site Investigation (i.e. soil report) should be conducted and be within **close proximity (within the project site or at most 1 or 2 houses away)** and representative of the soil layers of the site.

Thank You



@BCASingapore



Regulatory Updates on Building Plan Requirements

FAITH TAN

Executive Architect

BUILDING PLAN & POLICIES DEPARTMENT
BUILDING PLAN & MANAGEMENT GROUP



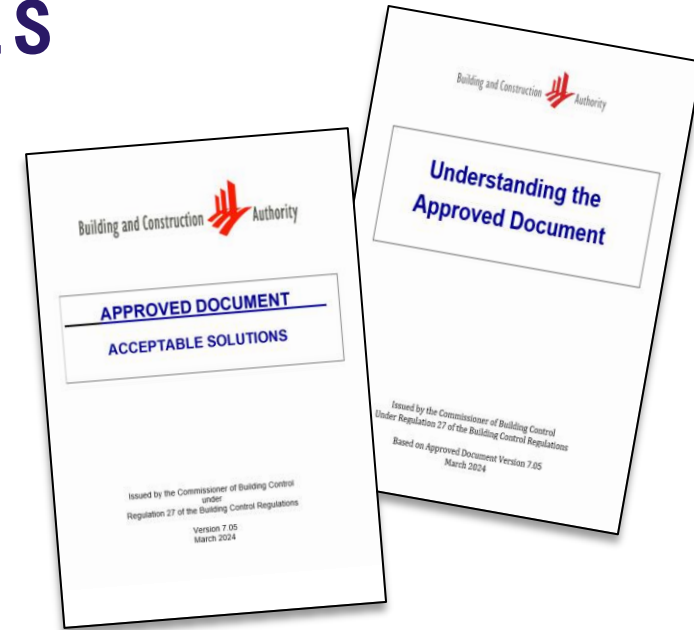
CONTENT

- ❖ APPROVED DOCUMENT UPDATES
- ❖ GENERAL OBSERVATIONS ON COMMON BUILDING PLAN NON-COMPLIANCES
- ❖ CIRCULAR UPDATES



APPROVED DOCUMENT UPDATES

- ❖ Updates to the **Approved Document Ver 7.05 (1 Mar 2024)** applies to to all projects submitted to the Commissioner of Building Control (CBC) for approval on or after 01 Sep 2024.
- ❖ The handbook, '**Understanding the Approved Document Ver 2.0**' have also been updated to align with the latest version of the Approved Document.



UPDATED SECTIONS

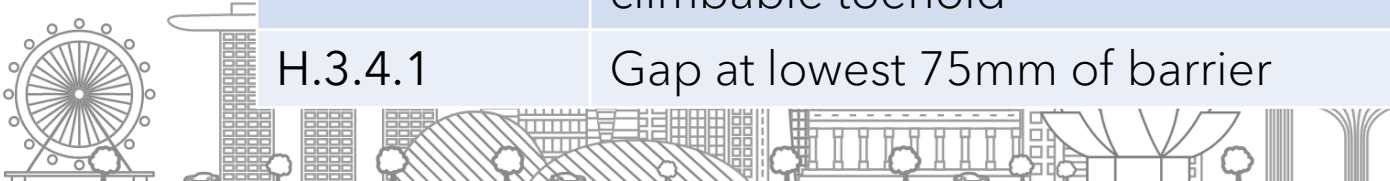
- C** HEADROOM AND CEILING HEIGHT
- E** STAIRCASES
- G** VENTILATION
- H** SAFETY FROM FALLING
- N** USE OF GLASS AT HEIGHT



COMMON BP NON-COMPLIANCES OBSERVED IN 2023

APPROVED DOCUMENT

| Clause | Description |
|----------|--|
| C.3.3.1 | The ceiling height of rooms and spaces shall not be less than 2.4 metres. |
| E.3.5.2 | An intermediate landing shall be provided in between floor levels at intervals of not more than 18 risers. |
| E.3.6.3A | Handrails shall have a circular section from 32mm to 50mm in diameter |
| G.2.1 | Ventilation shall be adequately provided in a building for its intended occupancy |
| G.2.2 | Residential buildings, other than houses built by the owners for their own use, shall be provided with natural ventilation |
| G.3.2.3 | No part of any room or space shall be located more than 12 metres from any window or opening for natural ventilation |
| H.3.4A | Barrier does not have a height of 850 mm when measured from the last climbable toehold |
| H.3.4.1 | Gap at lowest 75mm of barrier |

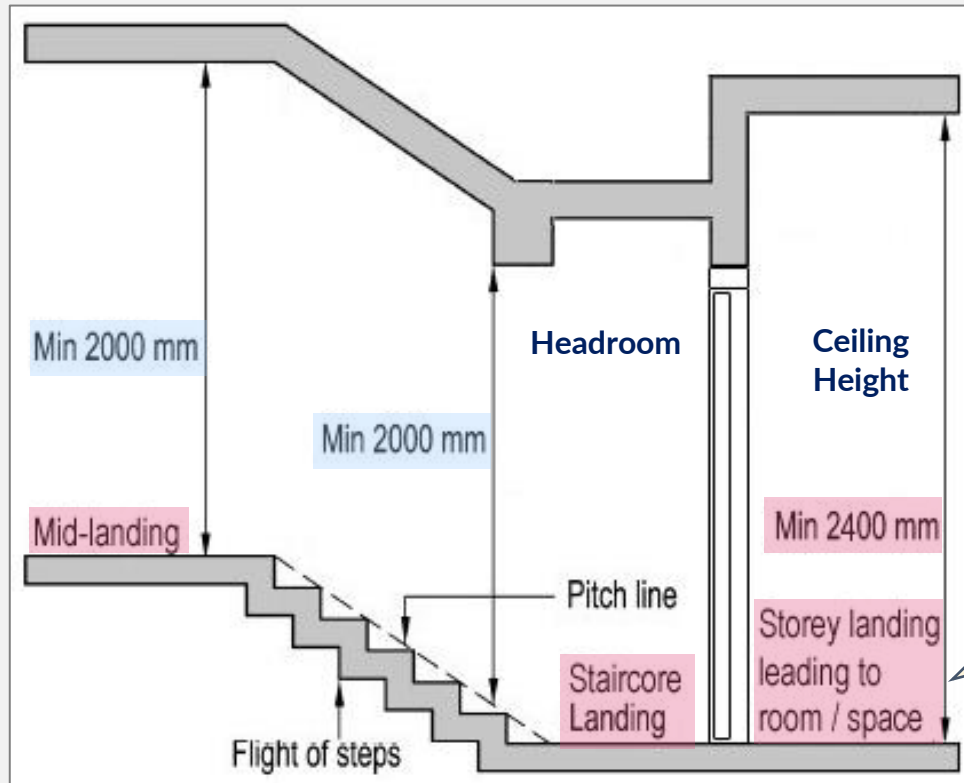


HEADROOM AND CEILING HEIGHT

AD SECTION C – Clause C.3.2.1

The headroom of every room, access route and circulation space shall not be less than 2.0 metres.

Figure C.3.2.1(a) – Measurement of Headroom



Differentiation between **headroom** versus **ceiling height**

(mid-landing vs. storey landing)

Storey Landing

Not within the staircase circulation path

[**Min. 2.4m clear**]



HEADROOM AND CEILING HEIGHT

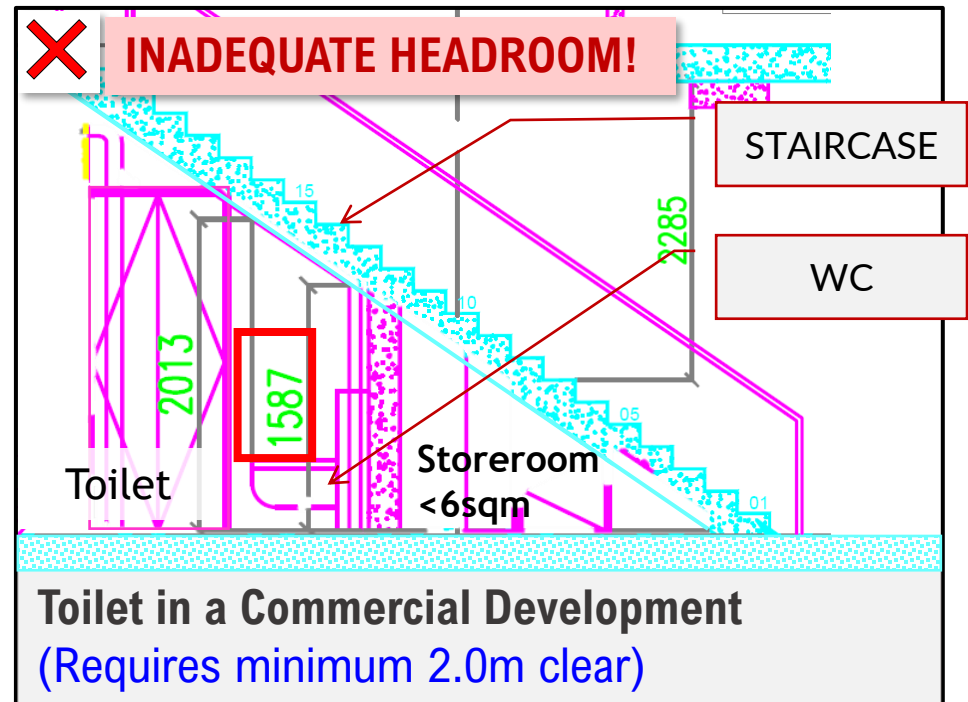
AD SECTION C – Clause C.3.2.1

The headroom of every room, access route and circulation space shall not be less than 2.0 metres.



STAIRCASES

No projection, other than handrails, is allowed in a staircase within a height of 2.0m from the landing or pitch line.



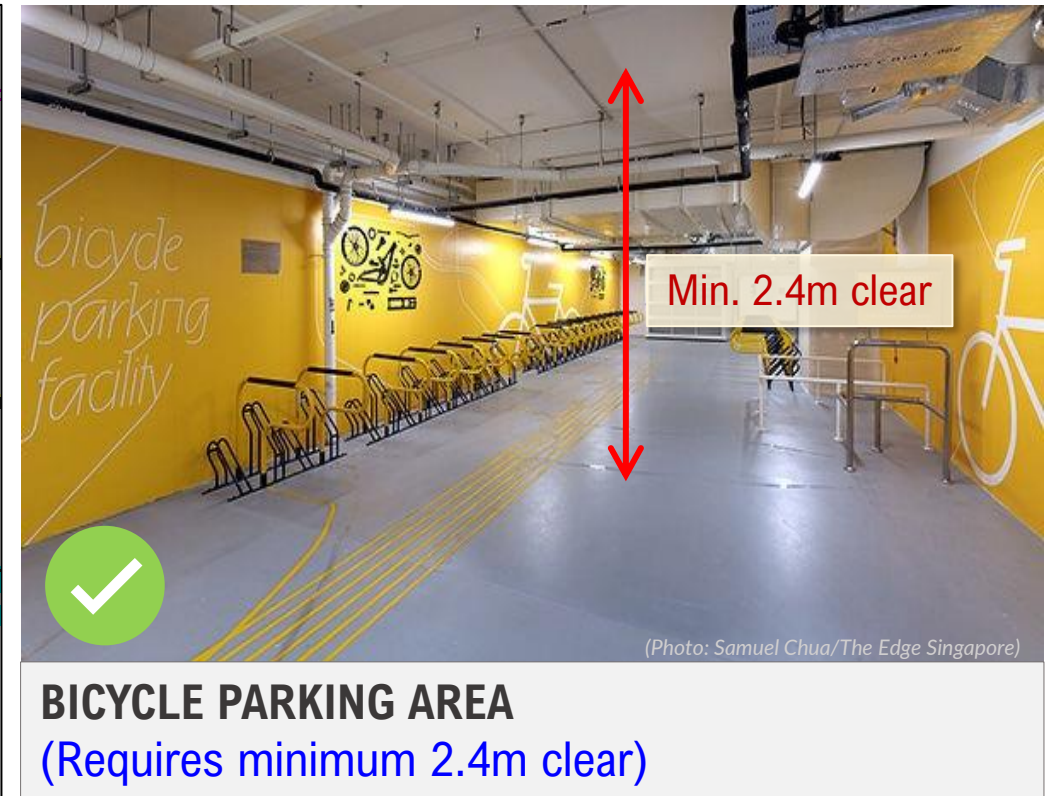
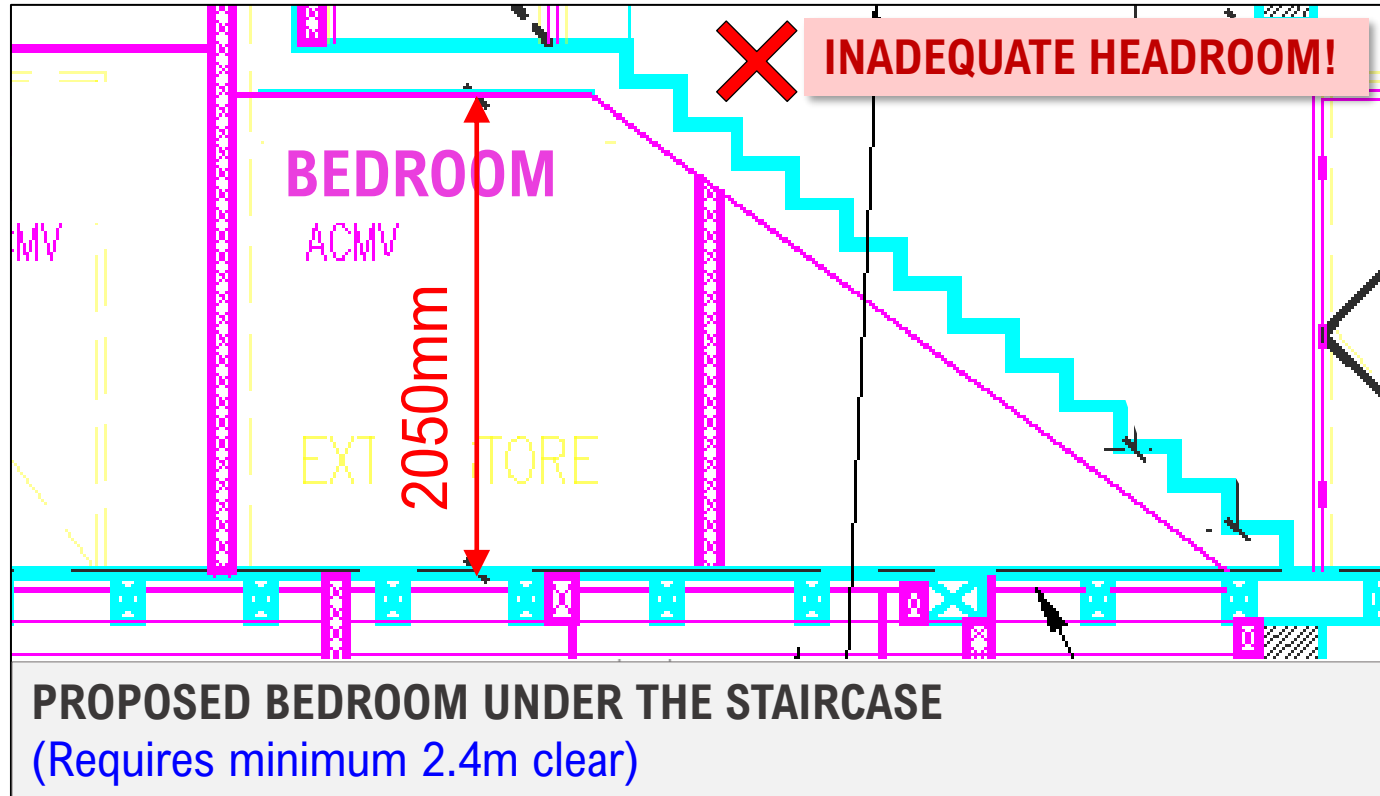
Common non-compliant areas:

- ✓ Staircases
- ✓ Corridors / Lobbies
- ✓ Attic >10sqm in owner's own-built houses
- ✓ Storeroom >6sqm
- ✓ Toilet, Bathroom or Powder Room in developer-built houses and other development types
- ✓ Underside of staircases with useable space under it

HEADROOM AND CEILING HEIGHT

AD SECTION C – Clause C.3.3.1

The ceiling height of rooms and spaces shall not be less than 2.4 metres.



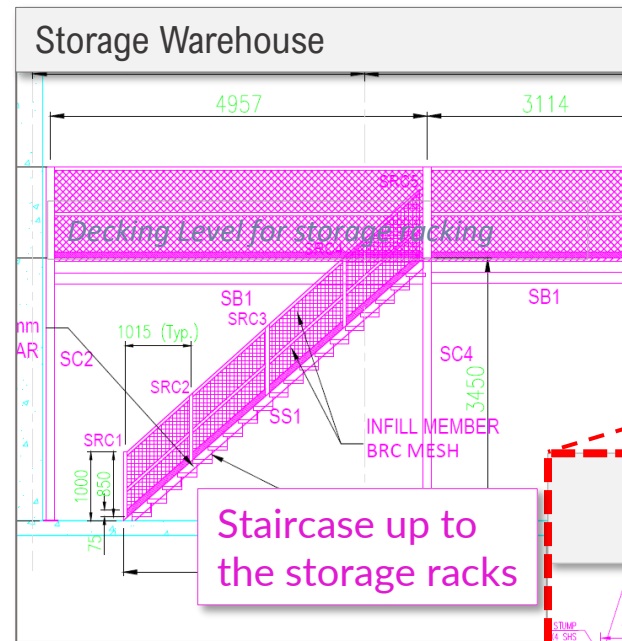
STAIRCASE LANDING

AD SECTION E – Clause E.3.5.2

Except for spiral staircases, an intermediate landing shall be provided in between floor levels at intervals of not more than 18 risers.

Common non-compliant areas:

- Maintenance roof top
- Non-landed residential developments
- Shophouse (Residential/ Commercial use)
- Storage warehouse

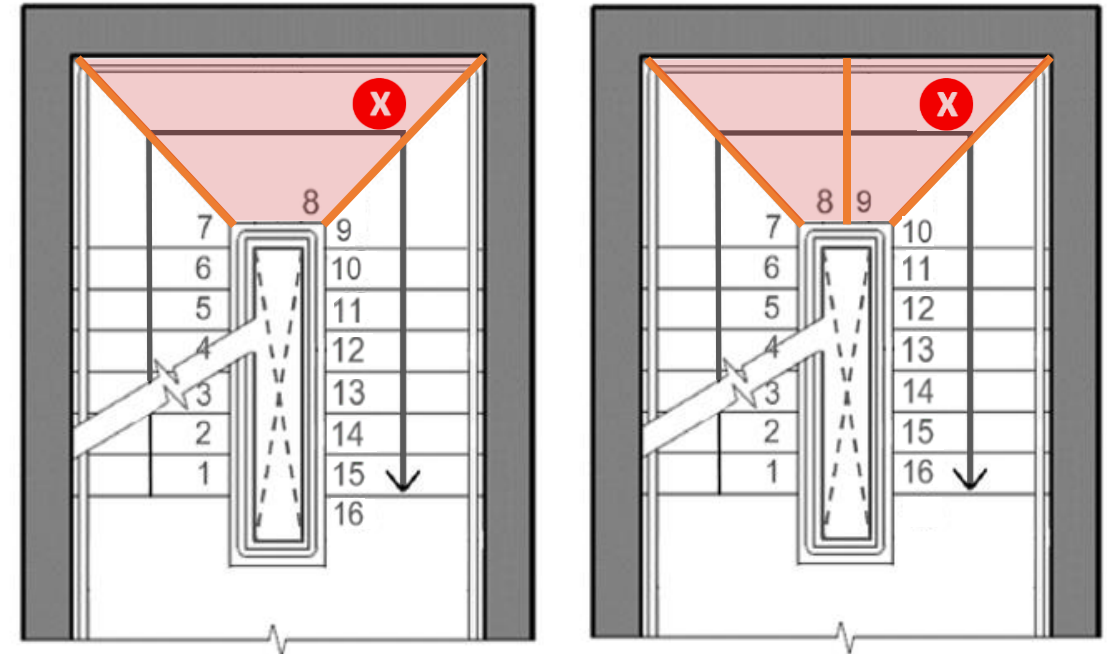
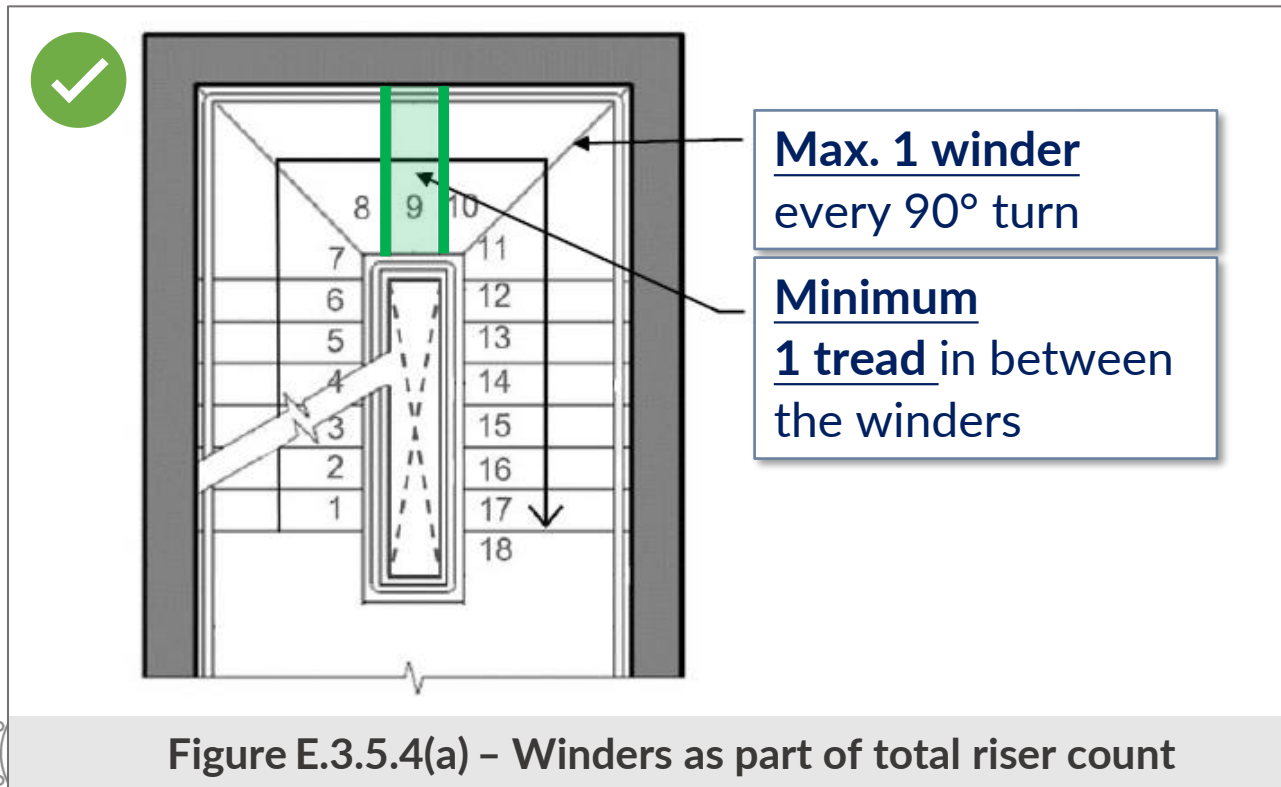


STAIRCASE WINDERS

AD SECTION E – Clause E.3.5.4

A landing shall not have any step or drop. A winder does not constitute a landing and is only allowed in a residential unit, where one winder is allowed in every 90 degrees turn in the staircase with a minimum of one tread in between.

Acceptable winder diagram:

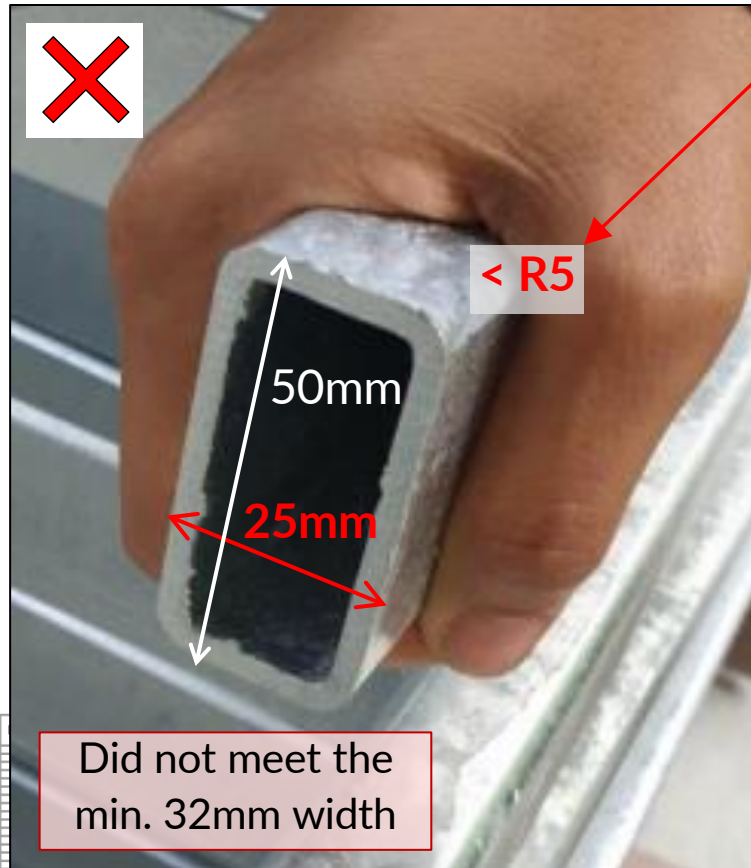
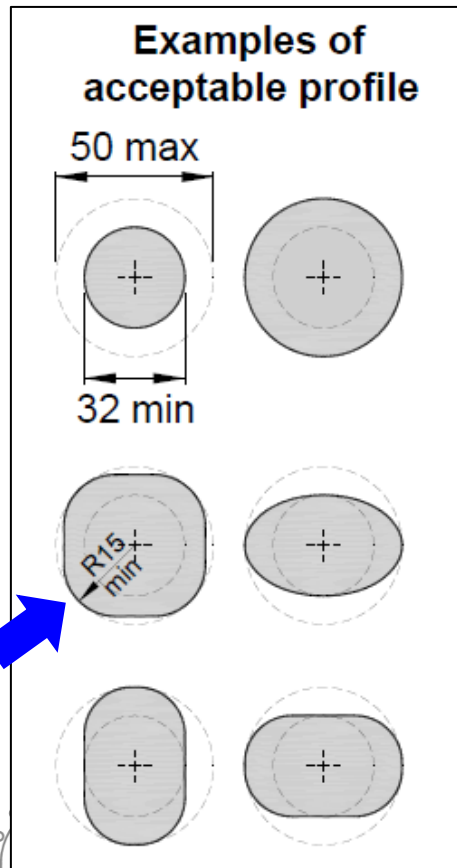


X Back-to-back winders is not acceptable with no tread provided in-between.

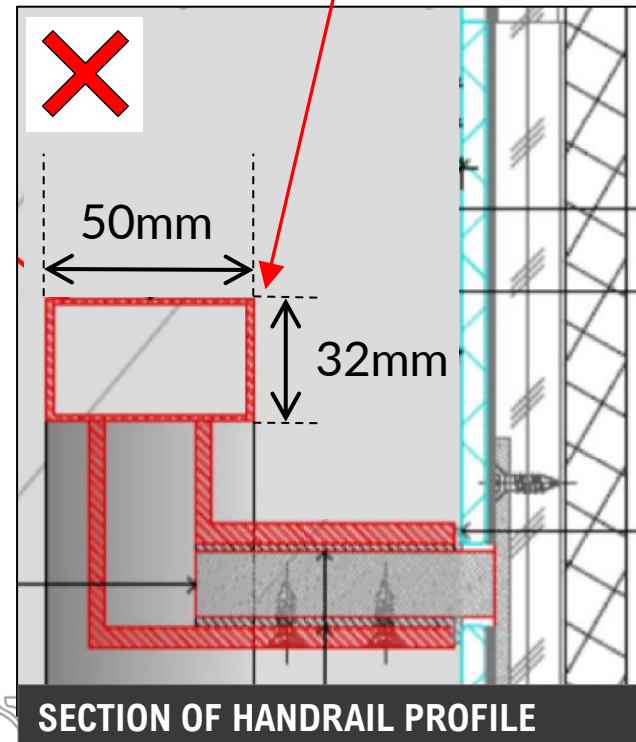
HANDRAILS

AD SECTION E – Clause E.3.6.3A

Handrails shall have a circular section from 32mm to 50mm in diameter or an equivalent gripping surface as shown in Code on Accessibility in the Built Environment, Clause 4.7.3.1(b)



X Corners are not rounded off to **min. 15° radius.**



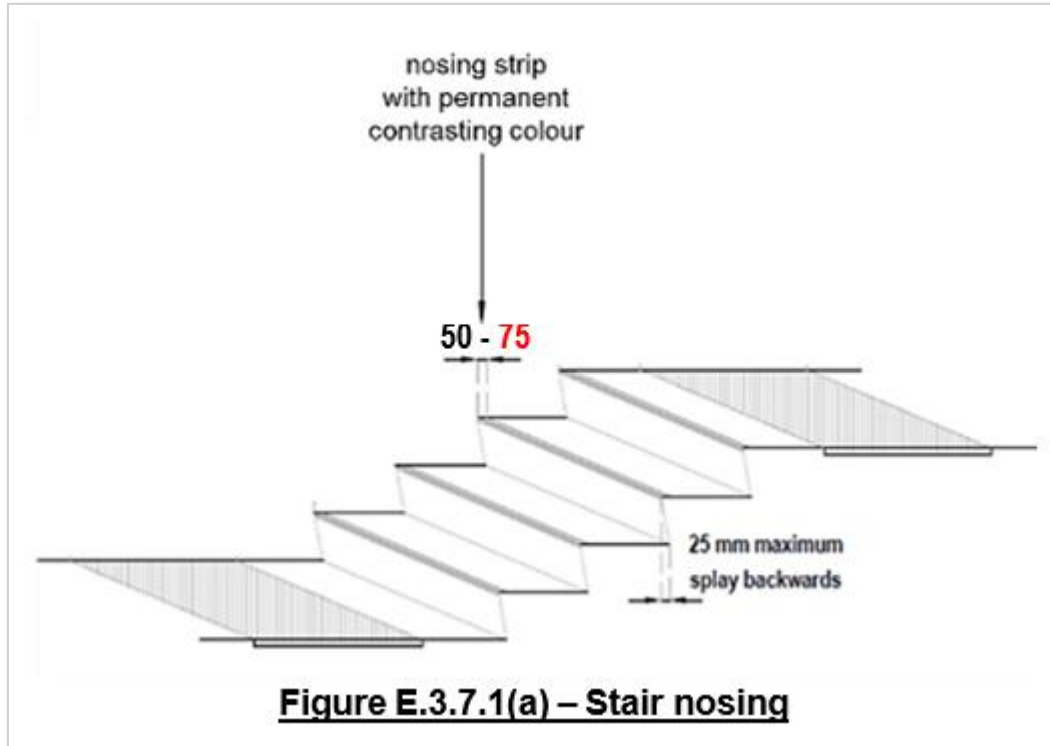
X Exceeded the maximum width of 50mm

Requirement is applicable to strata dwelling houses & industrial buildings

STAIRCASE NOSING

AD SECTION E – Clause E.3.7.2

All steps must be fitted with nosing strips between 50 mm and 75 mm in width.



| | |
|---|--|
| | |
| <p>Adhesive nosing tapes</p> | <p>Painted nosing wearing off over time</p> |
| | |
| <p>Fiberglass Reinforcement Plastic (FRP) / Glass Reinforcement Plastic (GRP)</p> | <p>Aluminum Frame with Silicon Carbide Anti-Slip Strip</p> |



NATURAL VENTILATION

AD SECTION G – Clause G.2.1-G.2.3

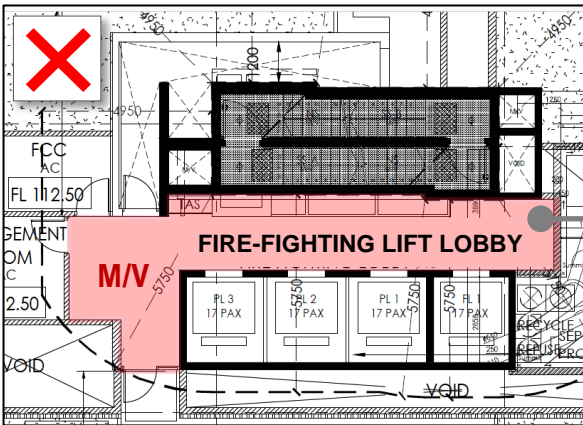
Ventilation shall be adequately provided in a building for its intended occupancy.

G.2.2 Residential buildings, other than houses built by the owners for their own use, shall be provided with natural ventilation for the purpose of paragraph G.2.1.

G.2.3 The requirement in paragraph G.2.1 does not apply to any of the following rooms or spaces **not exceeding an area of 6 square metres** –

- (a) any store room;
- (b) any private lift lobby;
- (c) any walk-in wardrobe;

AREAS <6SQM THAT ARE EXEMPTED



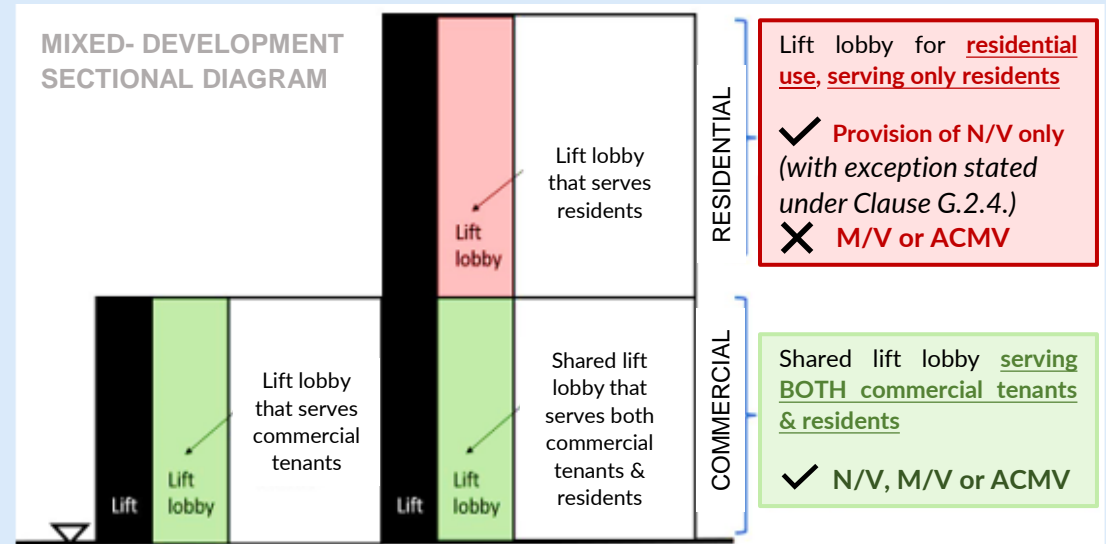
1st storey fire-fighting lift lobby in a residential development

Required to provide natural ventilation



***Please note that Clause G.2.2 applies to all developer built strata-titled residential properties.**

The provision of natural ventilation is applicable to **lift lobbies of mixed-use developments serving residents only**. Lift lobbies serving both commercial tenants and residents can be mechanically ventilated or air-conditioned.



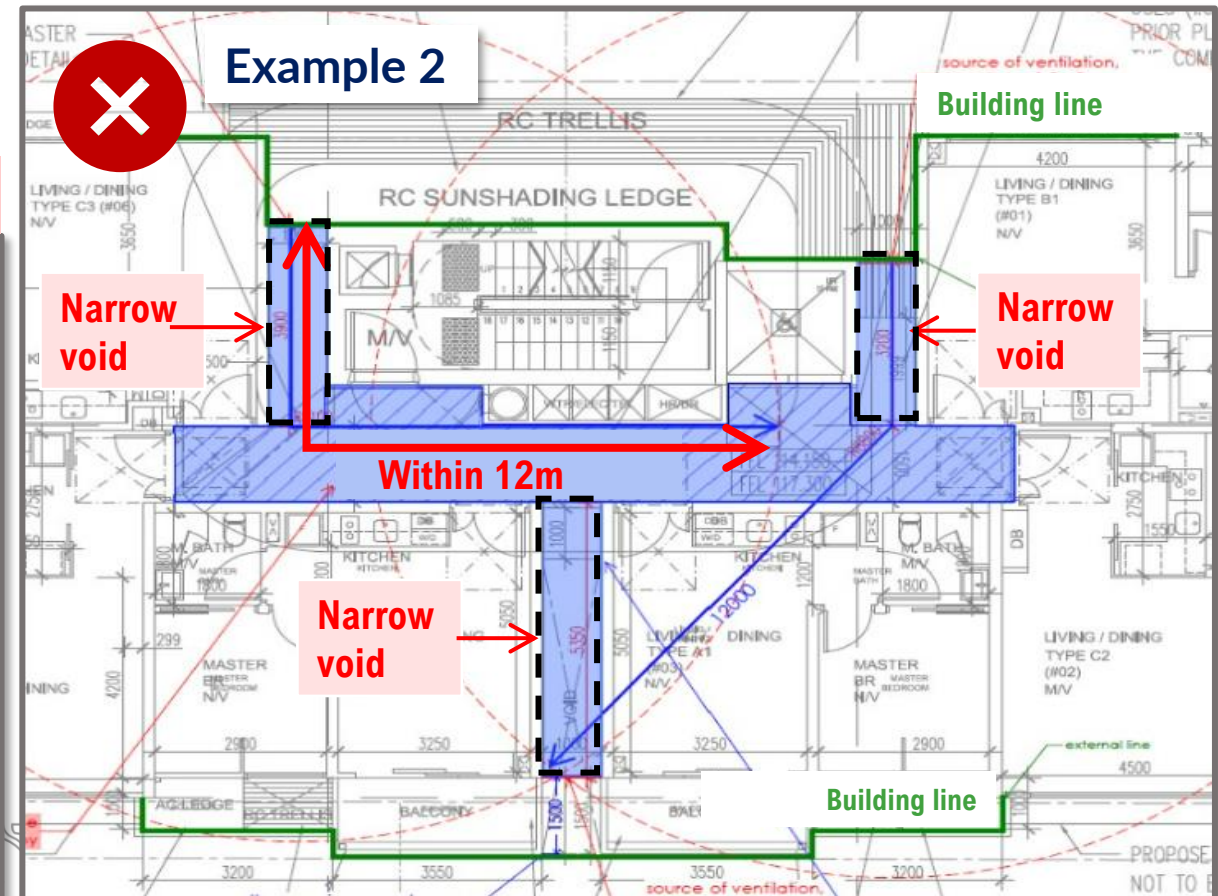
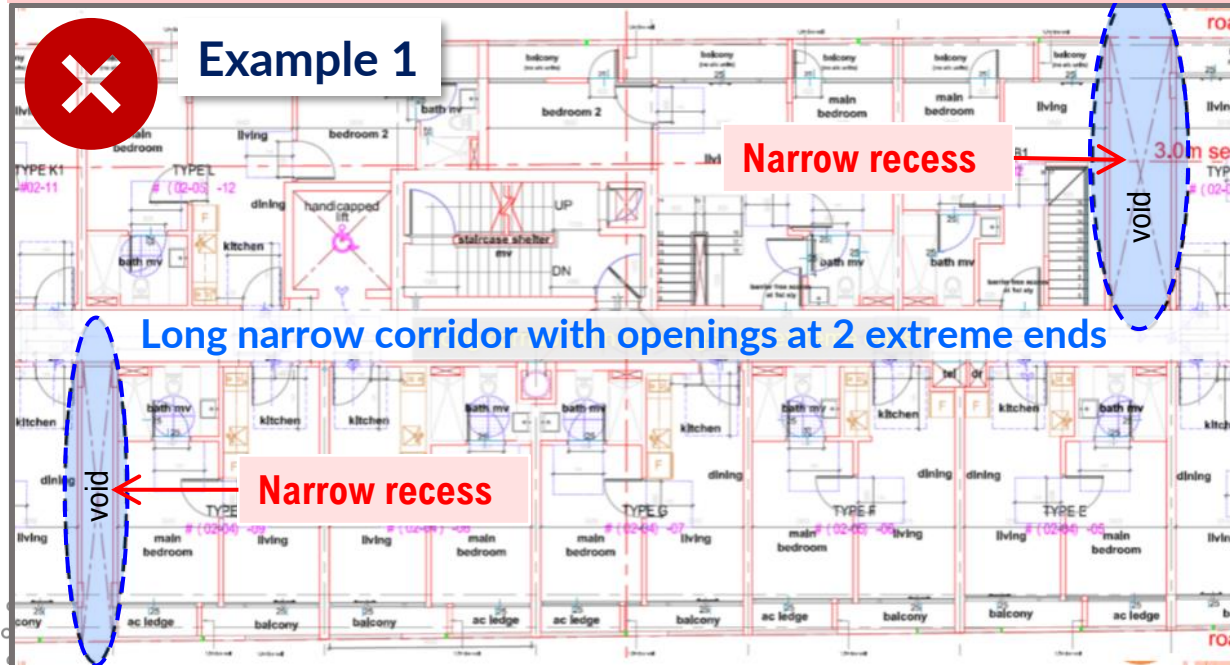
NATURAL VENTILATION

AD SECTION G – Clause G.3.2.3

No part of any room or space (other than a room in a warehouse) that is designed for natural ventilation shall be located more than 12 metres from any window or opening that is used to ventilate the room or space.

The 12.0m distance is measured from the center of the corridor to 2 ends of the openings, up to the external wall of the building. Recess must be minimally 3.0m wide and preferably not more than 3.0m depth.

EXAMPLES OF NON-COMPLIANT DESIGNS



SAFETY FROM FALLING

AD SECTION H – Clause H.2.2

The requirement in paragraphs H.2.1, H.2.1A and H.2.1B do not apply to any roof or maintenance area which is not easily accessible.

EXAMPLES OF 'EASILY ACCESSIBLE' AREAS

Examples of maintenance areas which are **easily accessible** to the public. Clauses H.2.1, H.2.1A and H.2.1B applies to these areas.



Padlocks

Figure H—IV: Door with padlock or a padlock gate to a maintenance area



Figure H—V: Staircase to the Roof

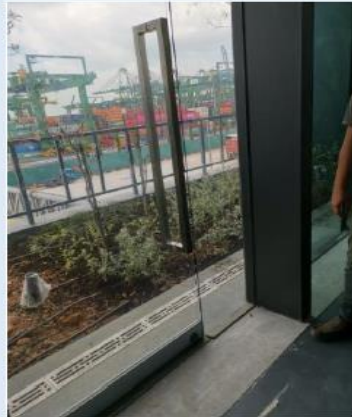


Figure H—VI: Accessible door opening to the maintenance roof through common space

EXAMPLES OF 'NOT EASILY ACCESSIBLE' AREAS



One-way lock & self closing door

Figure H—VII: One-way lock and self closing door / gate; with a signage to indicate maintenance area



Figure H—VIII: Locked-entry cat ladder / hatch doors; with signage to indicate maintenance area

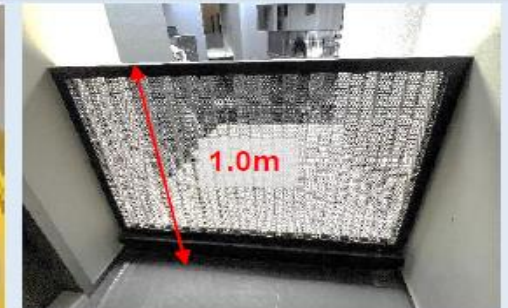
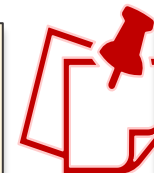


Figure H—IX: $\geq 1\text{m}$ wall / non-climbable barrier/parapet

To prevent easy access to the public, door to maintenance area/ roof shall have **access control** in the form of :

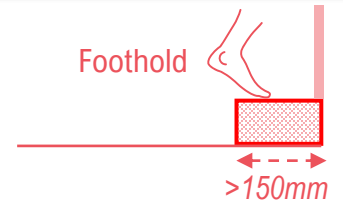
- ✓ One-way lock or EM lock
- ✓ Self-closing mechanism



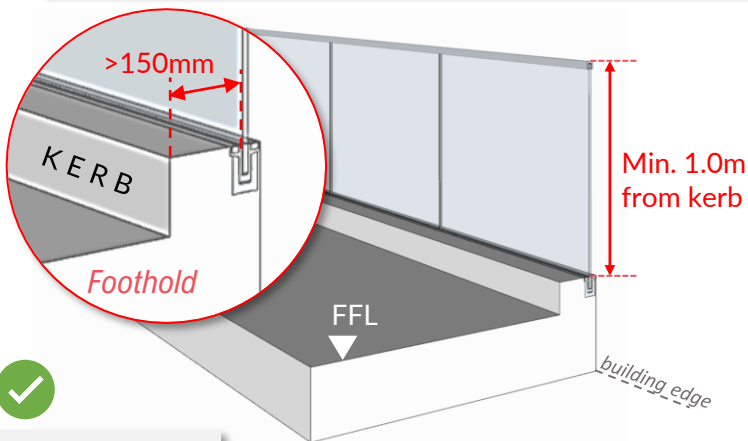
If a safety barrier is provided on a roof that is **'not easily accessible'**, full compliance for safety barriers must be adhered to. (E.g. Provision of 75mm toe plate/ kerb etc.)

REQUIREMENTS TO PREVENT CLIMBING

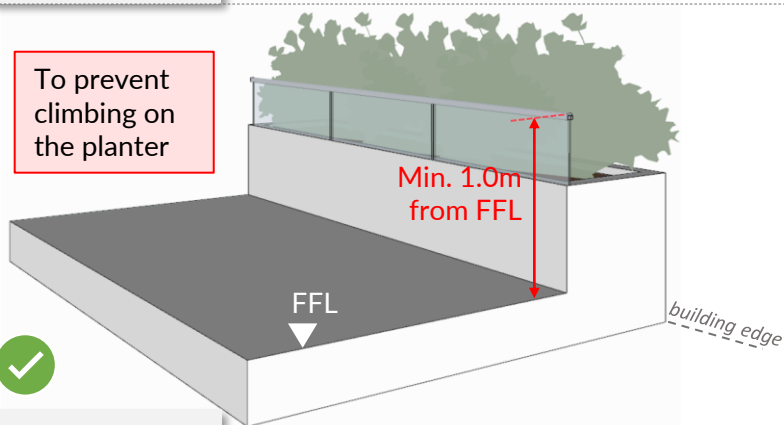
AD SECTION H - Clause H.3.2.1 (Note)



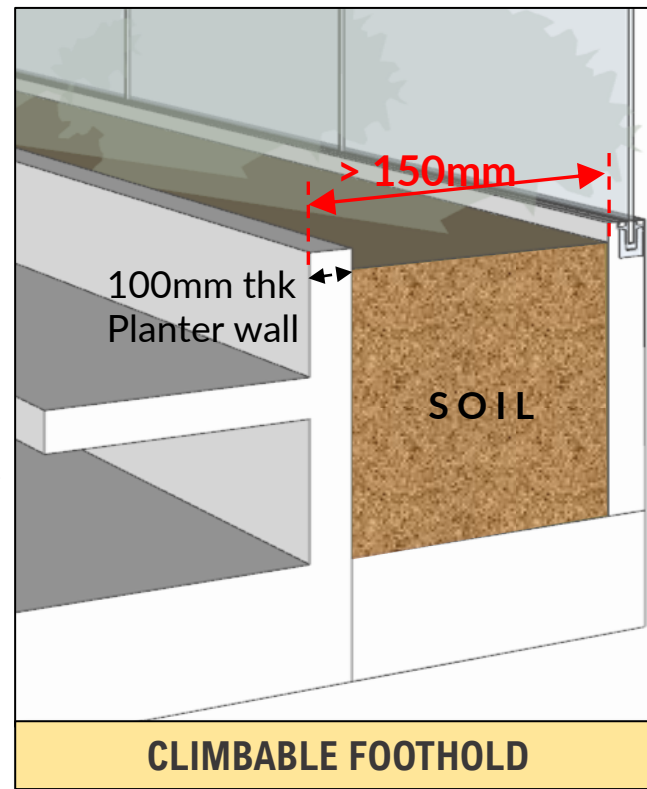
A kerb, protrusion or flat surface with dimensions more than 150 mm width by 150 mm length must be not less than 1000 mm away from the top of the barrier.



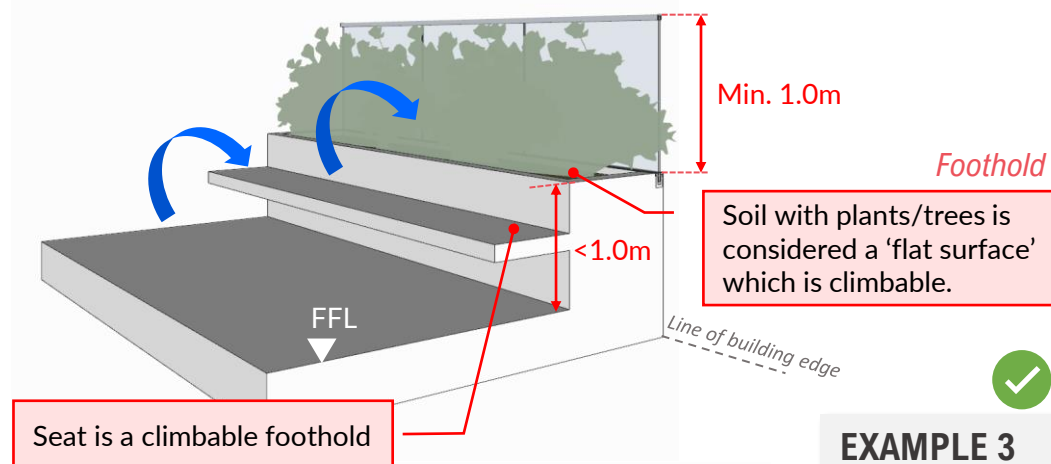
EXAMPLE 1



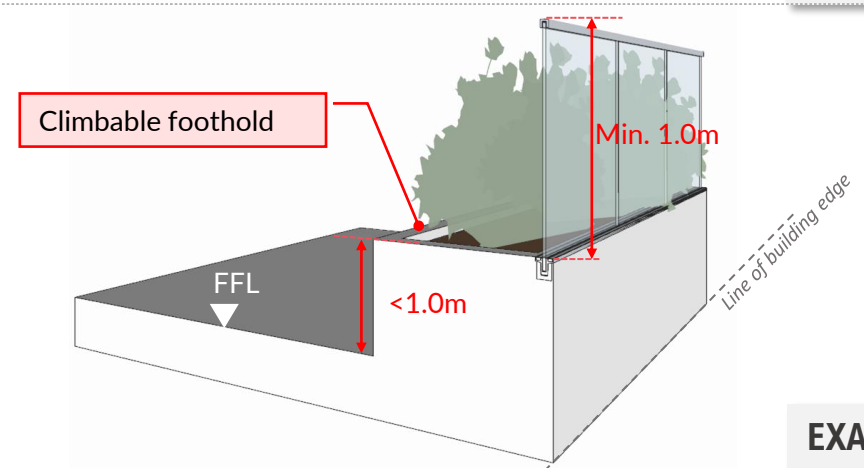
EXAMPLE 2



150x150mm flat surface includes **soil** with **planter wall**



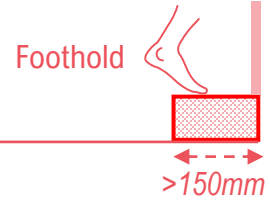
EXAMPLE 3



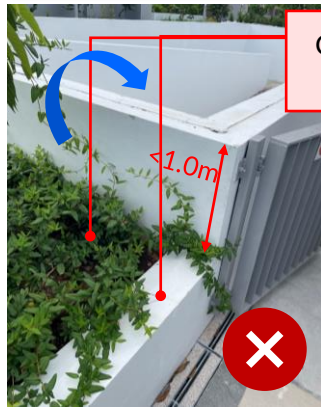
EXAMPLE 4

REQUIREMENTS TO PREVENT CLIMBING

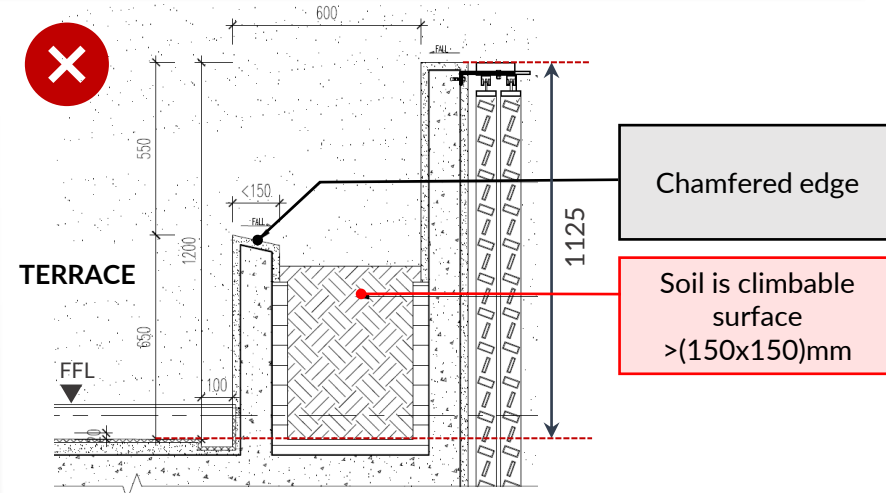
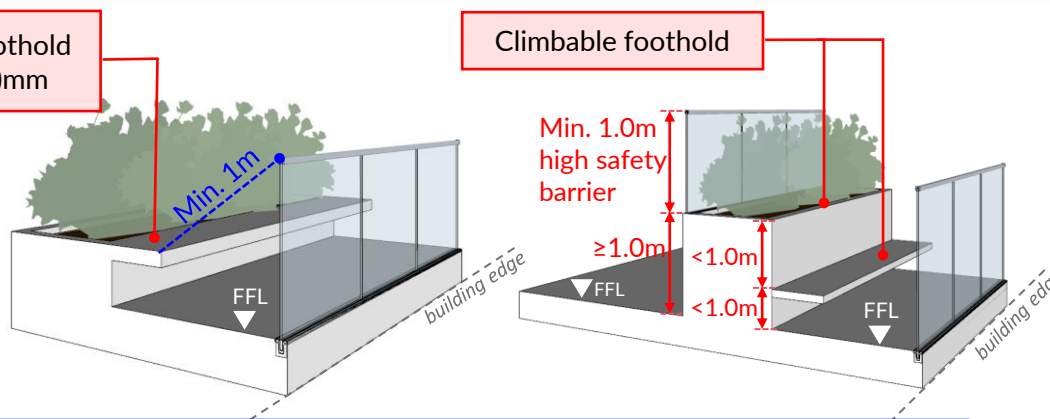
AD SECTION H – Clause H.3.2.1 (Note)



A kerb, protrusion or flat surface with dimensions more than 150 mm width by 150 mm length must be not less than 1000 mm away from the top of the barrier.

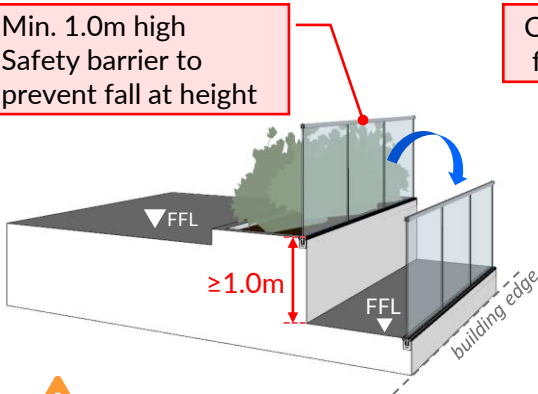


Climbable foothold
>(150x150)mm

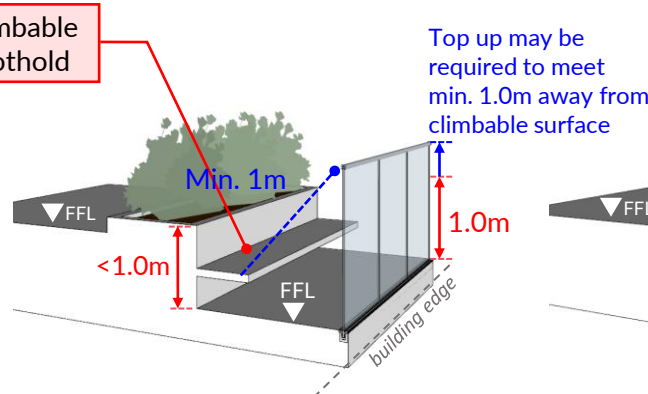


Min. 1m away from nearest climbable surface to the top of the safety barrier.

Min. 1.0m high Safety barrier to prevent fall at height

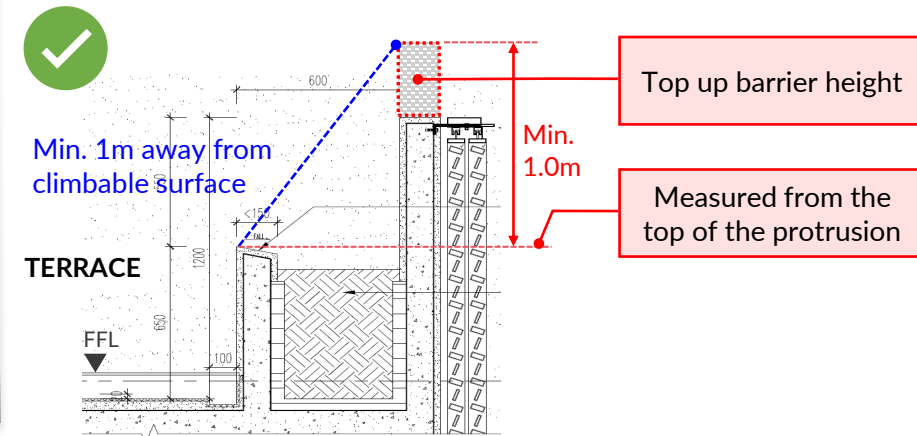
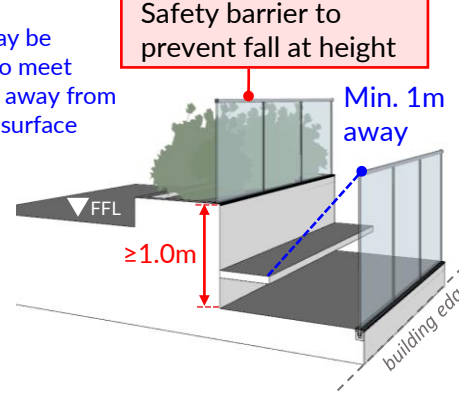


Climbable foothold



Top up may be required to meet min. 1.0m away from climbable surface

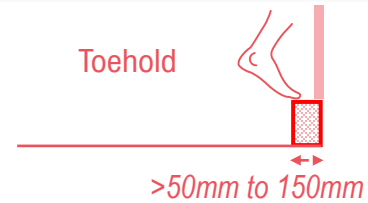
Min. 1.0m high Safety barrier to prevent fall at height



Note: Plants/ trees/ shrubs cannot act as a safety barrier to prevent fall from height.

REQUIREMENTS TO PREVENT CLIMBING

AD SECTION H – Clause H.3.4A



A barrier must have a height no less than 850mm when measured from the last climbable toehold.

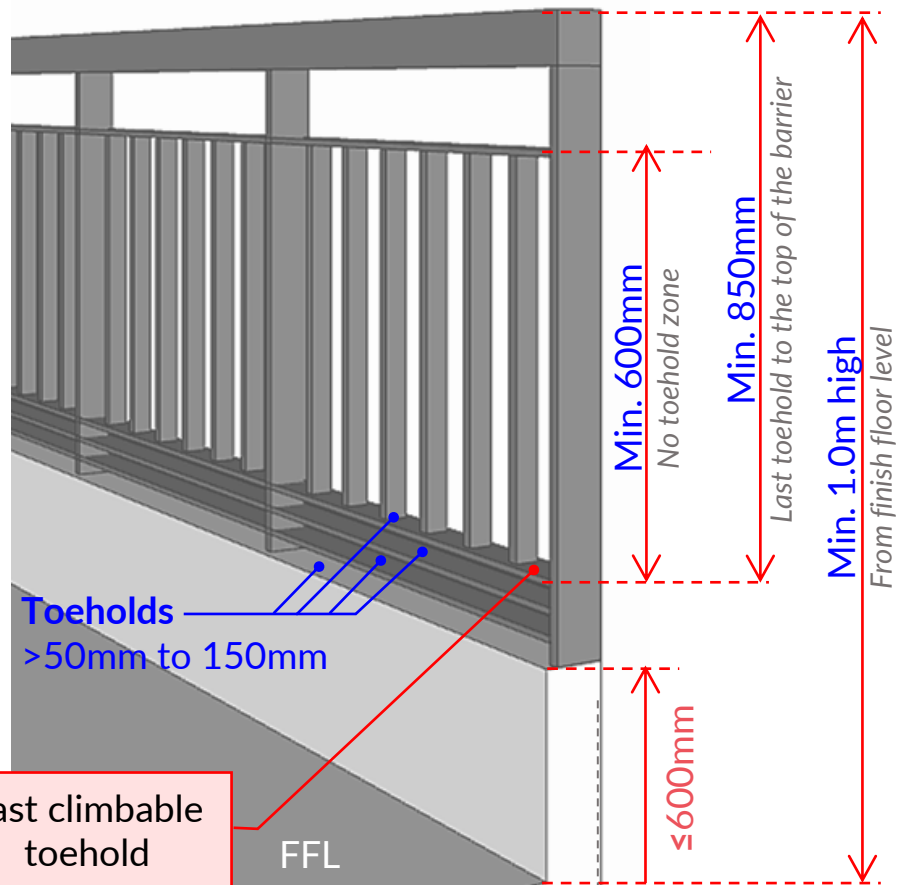
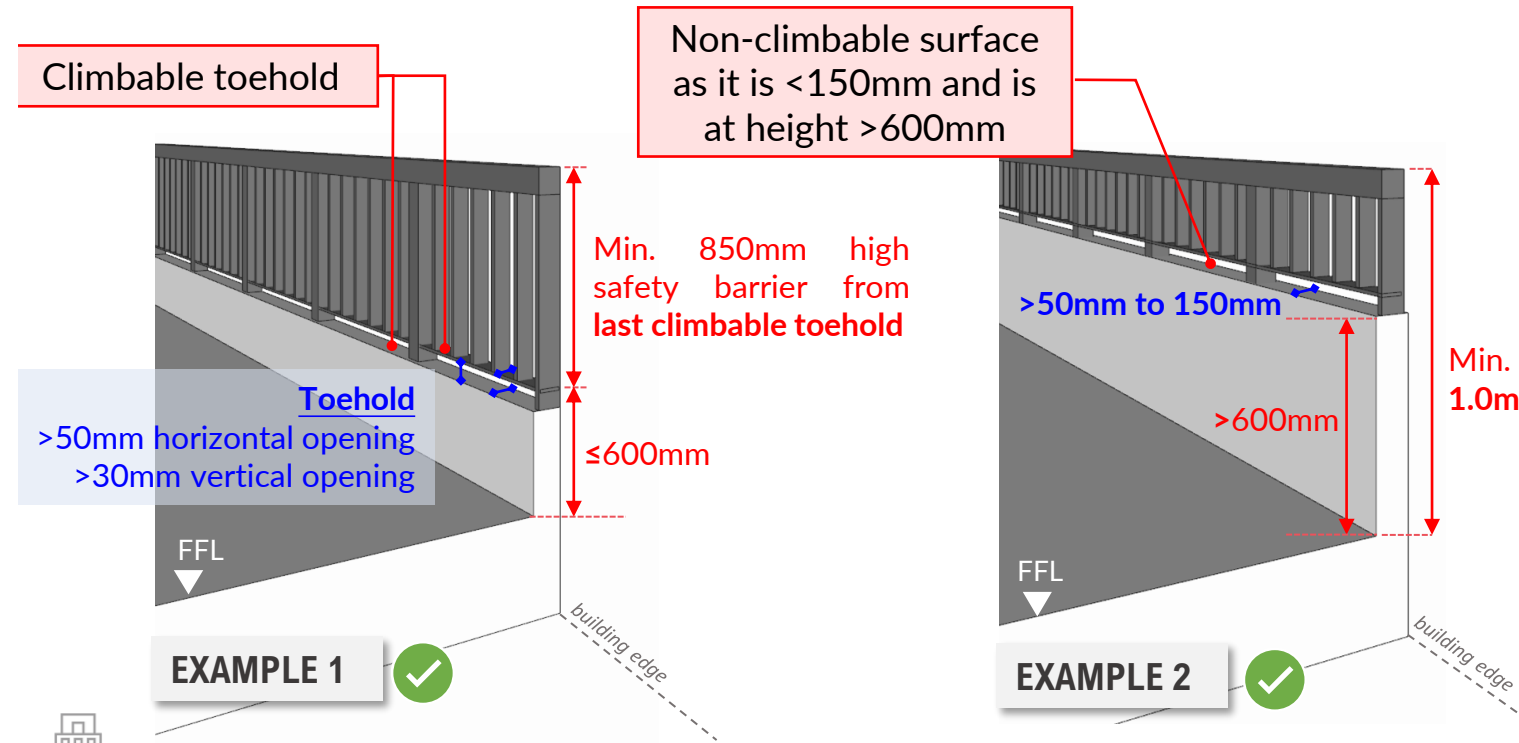


DIAGRAM 1



Toehold is any kerb/ protrusion having a width of **>50mm** and has a **chamfer gentler than 45°** relative to the horizontal plane.

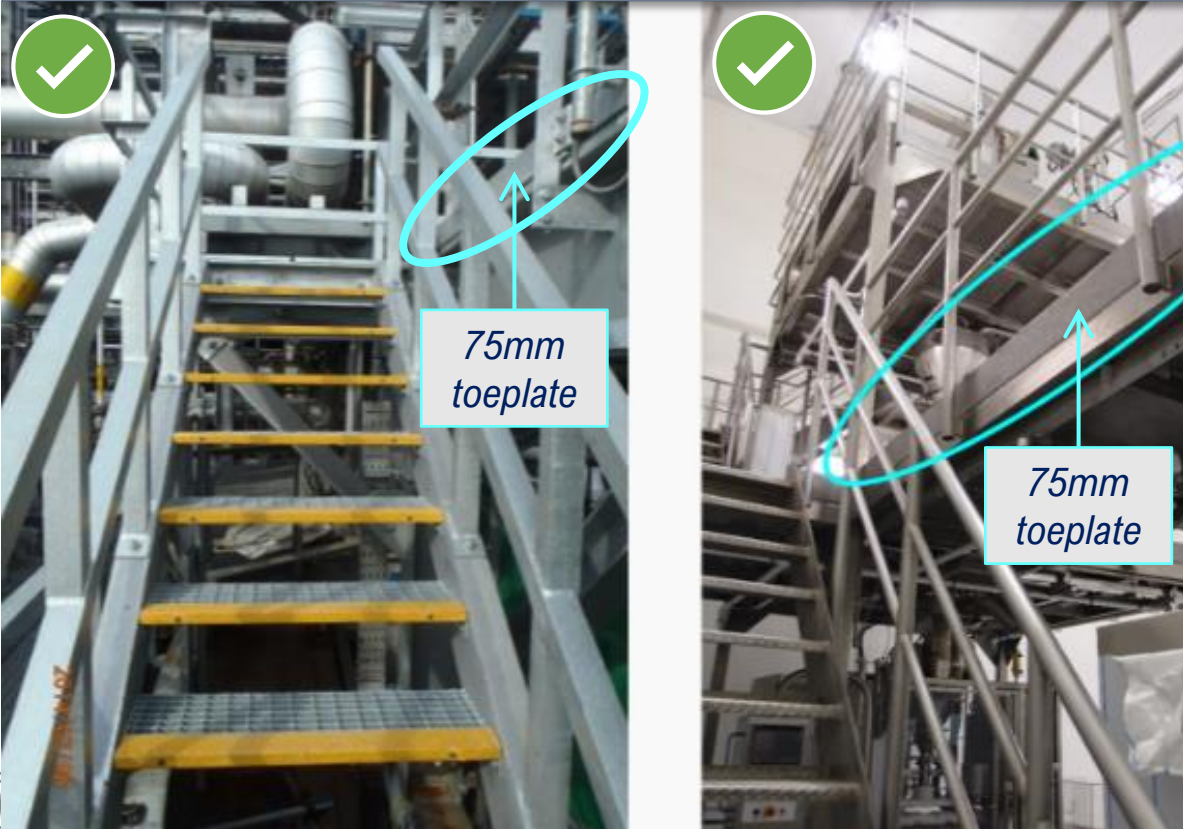
A **toehold** is climbable if it is located within **600 mm vertically** from the finished floor level; a step; or another climbable toehold.

SIZE OF OPENING

AD SECTION H – Clause H.3.4.1

There must not be any gap, from the finished floor level to a height no less than 75 mm, at the lowest part of a barrier.

STAIRCASES WITH PLATFORMS IN MAINTENANCE AREAS



- ✓ Applicable to barriers at height in **maintenance areas, production areas, conservation shophouse (including for owner's own use)**, including any areas accessible only by authorized personnel.
- ✓ All **landings** (intermediate or otherwise) and **platforms** must comply.

This requirement do not apply to house built for owner's own use.

CONTENT

- ❖ APPROVED DOCUMENT UPDATES
- ❖ GENERAL OBSERVATIONS ON COMMON BUILDING PLAN NON-COMPLIANCES
- ❖ CIRCULAR UPDATES



ISSUED 1 JUN 2023

HEIGHT CONTROL ADVISORY

JOINT ADVISORY IACC-CAAS-RSAF

CAAS and RSAF's Technical Height Limits are established in accordance with International Aviation Standards set by the International Civil Aviation Organization.



CAAS and RSAF **will not consider any waiver request** to lift the prescribed technical height controls.

Maximum Allowable Technical Height Control for sites are stipulated in:

- TCOT of GLS sites and/or URA's Planning Permission
- For non-GLS sites, Developer/QP can verify the limit via email to CAAS/RSAF.

Applies to any erection of temporary structures / construction equipment etc. **Developer and Qualified Person (QP) will need to seek clearance from the relevant aviation authority.**

CAAS and RSAF email



caas_ansp_ols@caas.gov.sg & height_control@defence.gov.sg



Our ref : APPBCA-2023-10

01 Jun 2023

See Distribution List

Dear Sir/Madam

JOINT IACC-CAAS-RSAF ADVISORY

ADVISORY ON COMPLIANCE WITH CAAS AND RSAF TECHNICAL HEIGHT CONTROLS AT ALL TIMES

This advisory is to clarify and remind the industry on the need to comply with the technical height controls imposed by CAAS¹ and RSAF at all times, including the development's construction phase, when construction equipment such as cranes are typically deployed.

ISSUED 1 JUN 2023

PUBLICATION OF ENFORCEMENT ACTIONS ON BCA WEBSITE



This circular seeks to inform the industry of the publication of enforcement actions on BCA's website for **contraventions** of the Building Control Act, the Building Maintenance and Strata Management Act, the Amusement Ride Safety Act, as well as their Regulations.

Enforcement actions are published on BCA's website (<https://go.gov.sg/bca-enforcement>)

The publication will set out key facts of the enforcement cases.

CIRCULAR



<https://go.gov.sg/bca-enforcementactions>

BCA is committed to ensuring high safety standards by putting in place an enforcement regime that fosters high standards of professional conduct and metes out enforcement outcomes that deter contraventions and unsafe outcomes.



Build The logo for 'Build SG' features the word 'Build' in a bold, black, sans-serif font, followed by 'SG' in a white, bold, sans-serif font inside a red circle.



Thank You



@BCASingapore



Common Findings and Good Design Practices for CD Shelter

Er. RITA WONG

Senior Engineer

BUILDING PLAN & POLICIES DEPARTMENT
BUILDING PLAN & MANAGEMENT GROUP

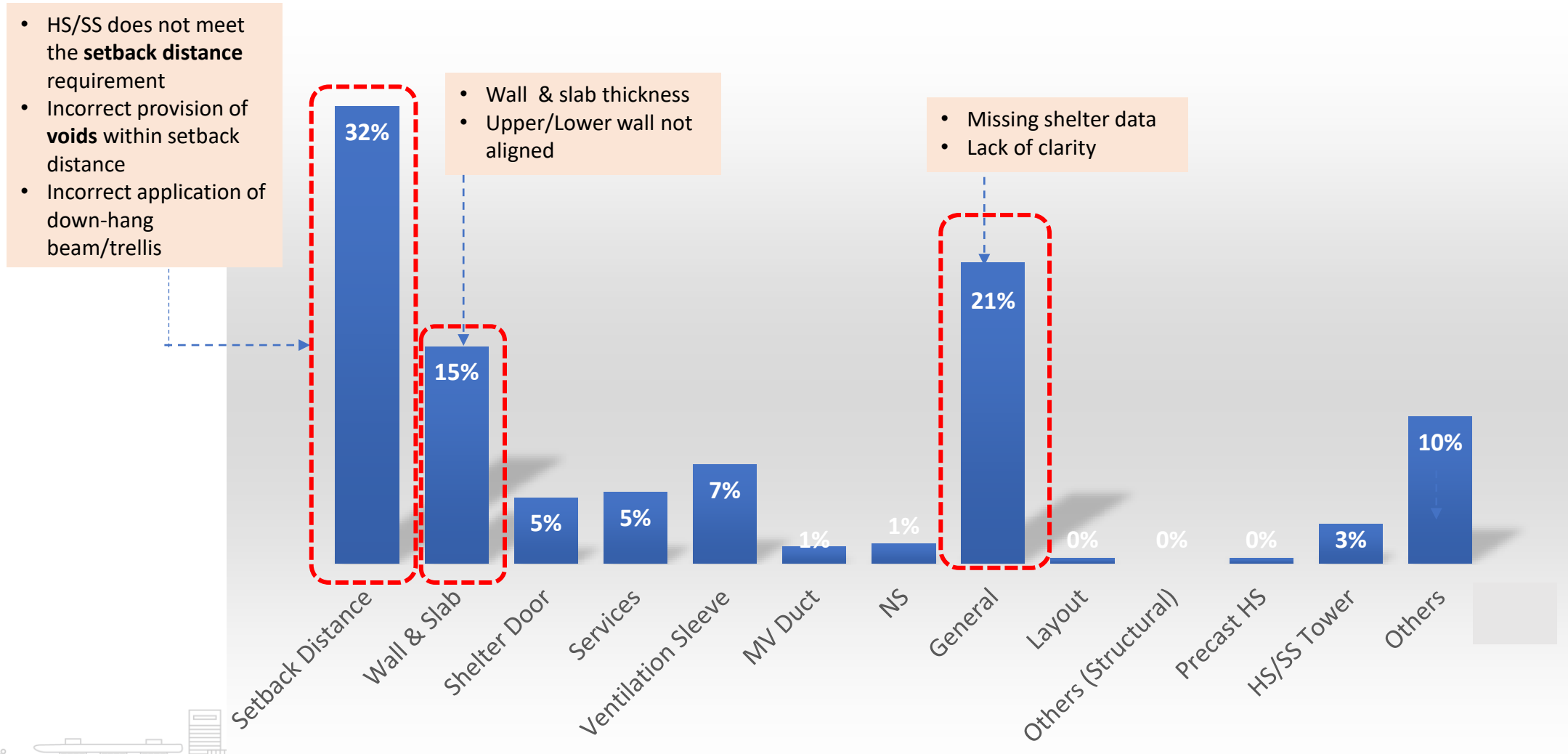


CONTENT

- ❖ COMMON FINDINGS IN CD SHELTER SUBMISSIONS
- ❖ GOOD PRACTICES FOR CD SHELTER SUBMISSION
- ❖ RECENT UPDATES ON TRHS/TRSS



COMMON NON-COMPLIANCES IN CD SHELTER SUBMISSIONS



COMMON NON-COMPLIANCES IN CD SHELTER SUBMISSIONS

Household Shelter (HS)

1. HS setback distances, non-shelter (NS) design and shielding wall requirements not complied with
2. Incorrect provision of voids within HS setback distance
3. Incorrect ventilation sleeve locations

Storey Shelters (SS)

1. SS/NS wall thickness and clear heights not according to Table 2.3.1 of TR SS
2. SS setback distance not complied with
3. Incorrect application of down-hang beam/trellis to make up for shortfall in SS setback distance
4. Incorrect provision of voids within SS setback distance
5. Non-compliance of 200mm RC shielding in front of entrance SS door
6. For staircase storey shelters, incorrect provision of shelter space in the staircase for occupants of a particular storey
7. For staircase storey shelters, SS/NS walls not continuous to foundation



Common Findings in CD shelter submissions



MISSING DATA

| Data of Household Shelter Development | | | | | | |
|---------------------------------------|-------------------------------|-----------|------------------------------|---------------------|--------------------------------|--------------|
| Dwelling Unit Type: | GFA of Unit (m ²) | No. of HS | Area of HS (m ²) | No. of Square Units | Volume of HS (m ³) | Shelter Type |
| PLOT 1 Semi-Detached | 269.92 M ² | 1 | 3.85 m ² | 8 | 10.78 m ³ | HA |
| PLOT 2 Semi-Detached | 225.71 M ² | 1 | 3.34 m ² | 8 | 9.35 m ³ | HA |

Note:

- 1) To provide Data of HS/SS
- 2) For shapes other than specified (square or rectangular in the TRHS/TRSS, Please refer to TRHS.



Missing or inadequate HS/SS data i.e. Area & Volume not indicated, or Area/Volume does not meet the requirement in TRHS.

Square HS

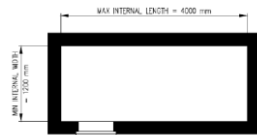
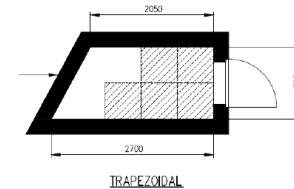


TABLE 2.2.1(b) MINIMUM INTERNAL HS FLOOR AREA AND VOLUME

| GFA* of a House (m ²) | HS Floor Area (m ²) | HS Volume (m ³) |
|-----------------------------------|---------------------------------|-----------------------------|
| GFA ≤ 40 | 1.44 | 3.6 |
| 40 < GFA ≤ 45 | 1.6 | 3.6 |
| 45 < GFA ≤ 75 | 2.2 | 5.4 |
| 75 < GFA ≤ 140 | 2.8 | 7.2 |
| GFA > 140 | 3.4 | 9.0 |

Trapezoidal HS



L-Shape HS

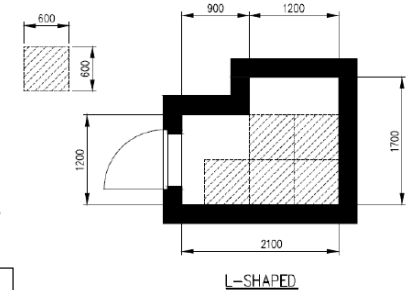
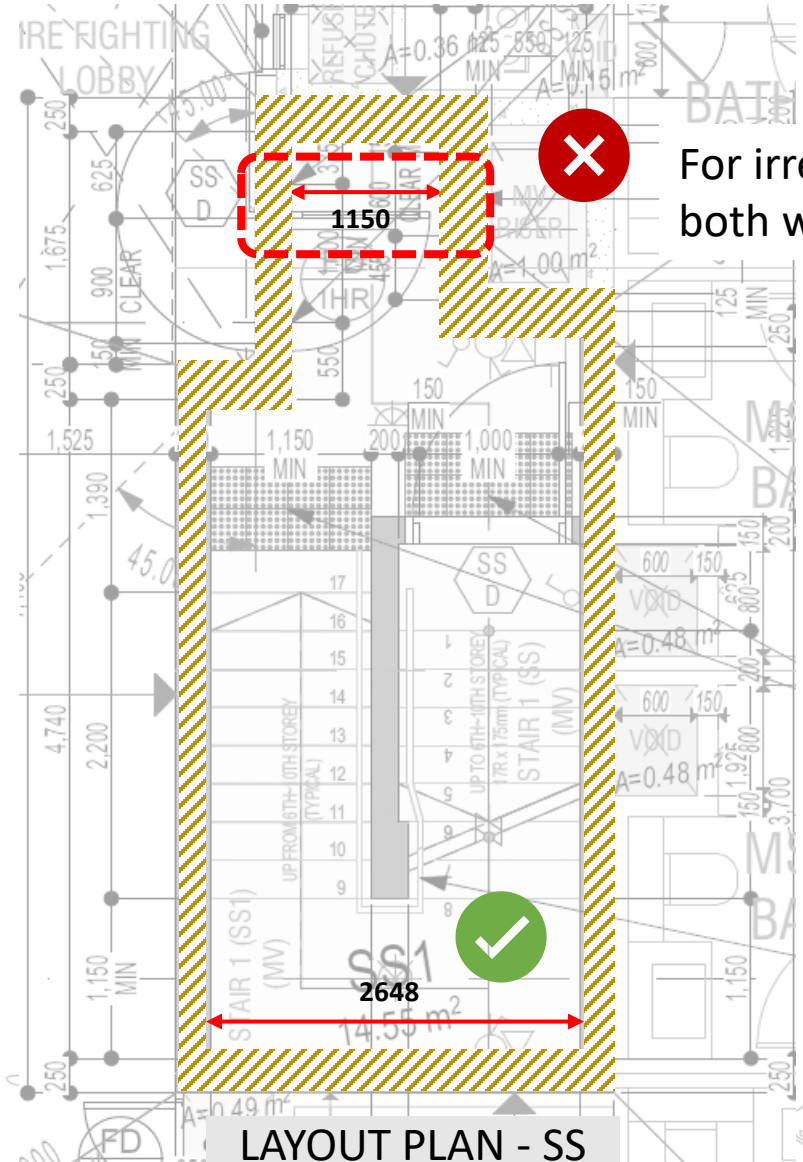


TABLE 2.2.1(c) NUMBER OF SQUARE UNITS (0.6m x 0.6m) USED FOR THE ASSESSMENT OF TRAPEZOIDAL OR L-SHAPED HS


| GFA* of a House (m ²) | HS Floor Area (m ²) | HS Volume (m ³) | Number of Square Units |
|-----------------------------------|---------------------------------|-----------------------------|------------------------|
| GFA ≤ 40 | 1.44 | 3.6 | 3 |
| 40 < GFA ≤ 45 | 1.6 | 3.6 | 3 |
| 45 < GFA ≤ 75 | 2.2 | 5.4 | 4 |
| 75 < GFA ≤ 140 | 2.8 | 7.2 | 5 |
| GFA > 140 | 3.4 | 9.0 | 6 |

* The GFA refers to GFA of the house which shall be in accordance with URA guidelines and other statutory requirements for peacetime usage.

INSUFFICIENT MIN. INTERNAL WIDTH



For irregular SS where there are 2 different width, both widths shall have min. 1200mm.

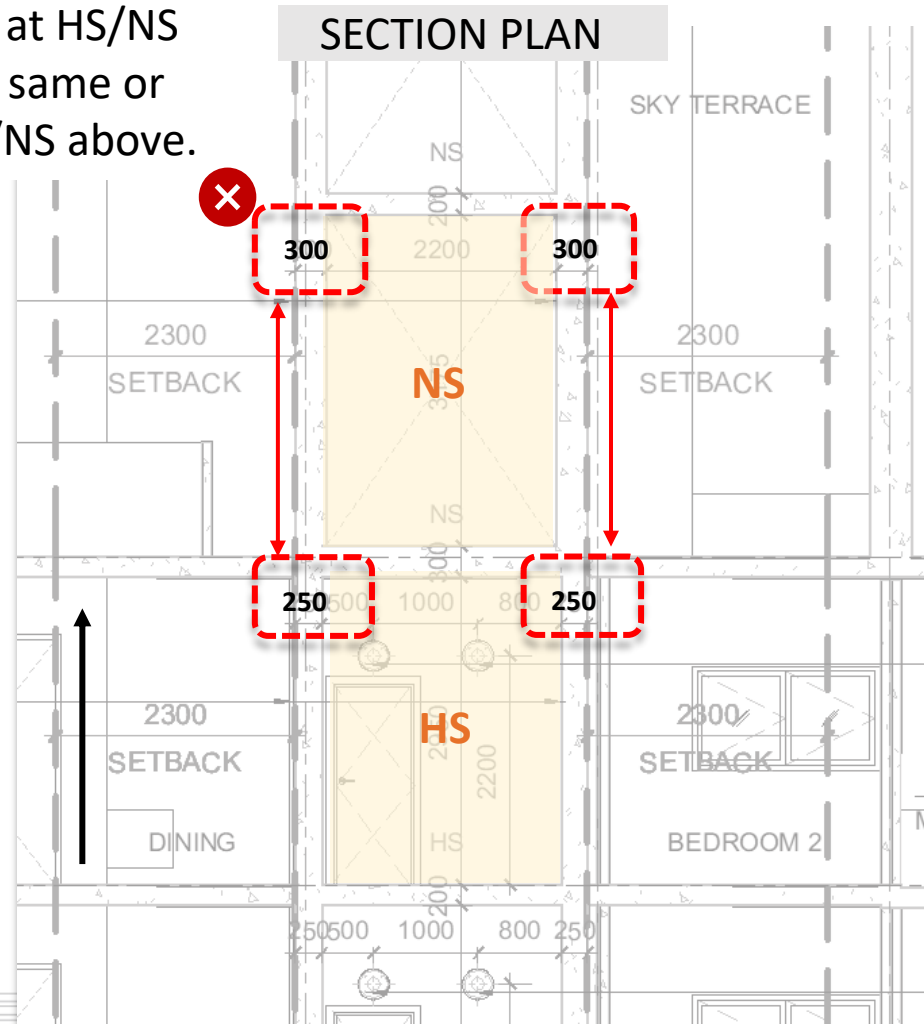
Note: 

- 1) The maximum internal length of any floor and roof slab of a SS shall be 10000mm. The minimum internal width of a SS or S/C SS shall be 1200mm. Refer to FIGURE 2.2.1(a) and 2.2.1(b).



INSUFFICIENT WALL THICKNESS

Wall thickness at HS/NS below shall be same or more than HS/NS above.

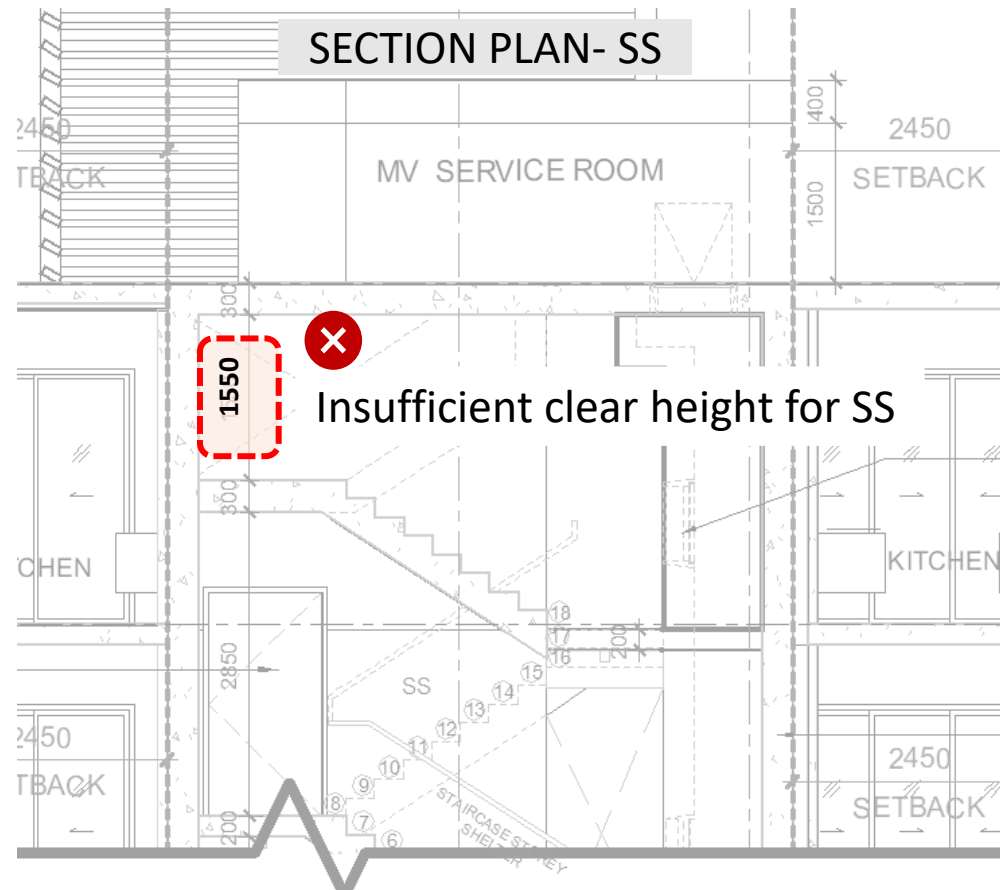


Note:



Cl. 2.4.2 HS Tower – HS wall shall be aligned and continuous to the foundation.
 Cl. 2.3.1 HS wall thickness - Wall thickness of any HS or NS within the HS tower shall not be less than the wall thickness of the HS or NS above it.

INSUFFICIENT MIN. CLEAR HEIGHT



Note:

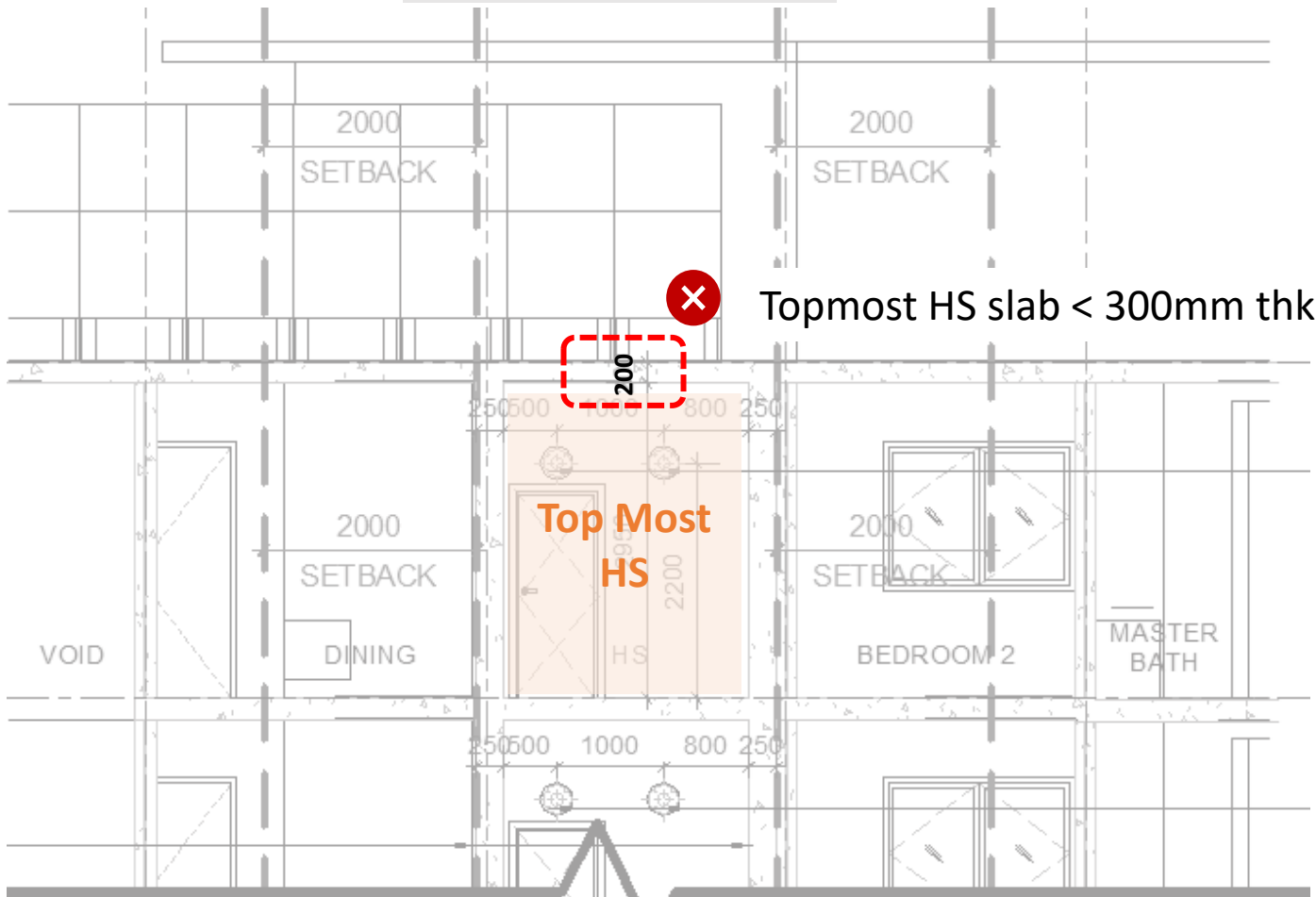


- 1) Cl. 2.2.2 – The minimum SS clear height shall be 2400mm. Refer to FIGURE 2.2.1(a). The minimum NS clear height shall be 2400mm.



INSUFFICIENT TOPMOST SLAB THICKNESS

SECTION PLAN - HS



Note:

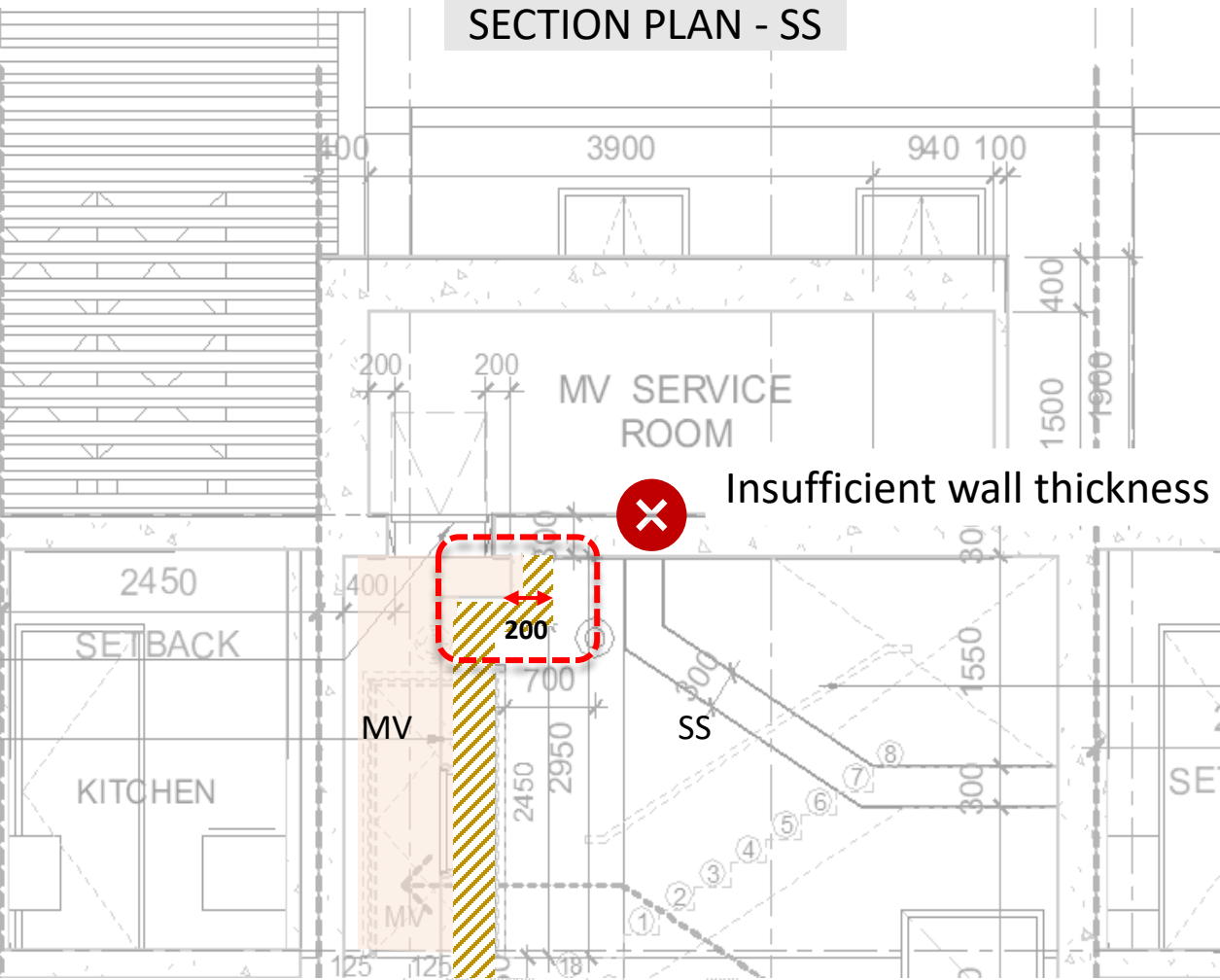



Fig 2.3.2 – Ceiling slab of top-most HS in non-landed development - 300mm. See FIGURE 2.3.2.



INSUFFICIENT WALL & SLAB THICKNESS

SECTION PLAN - SS

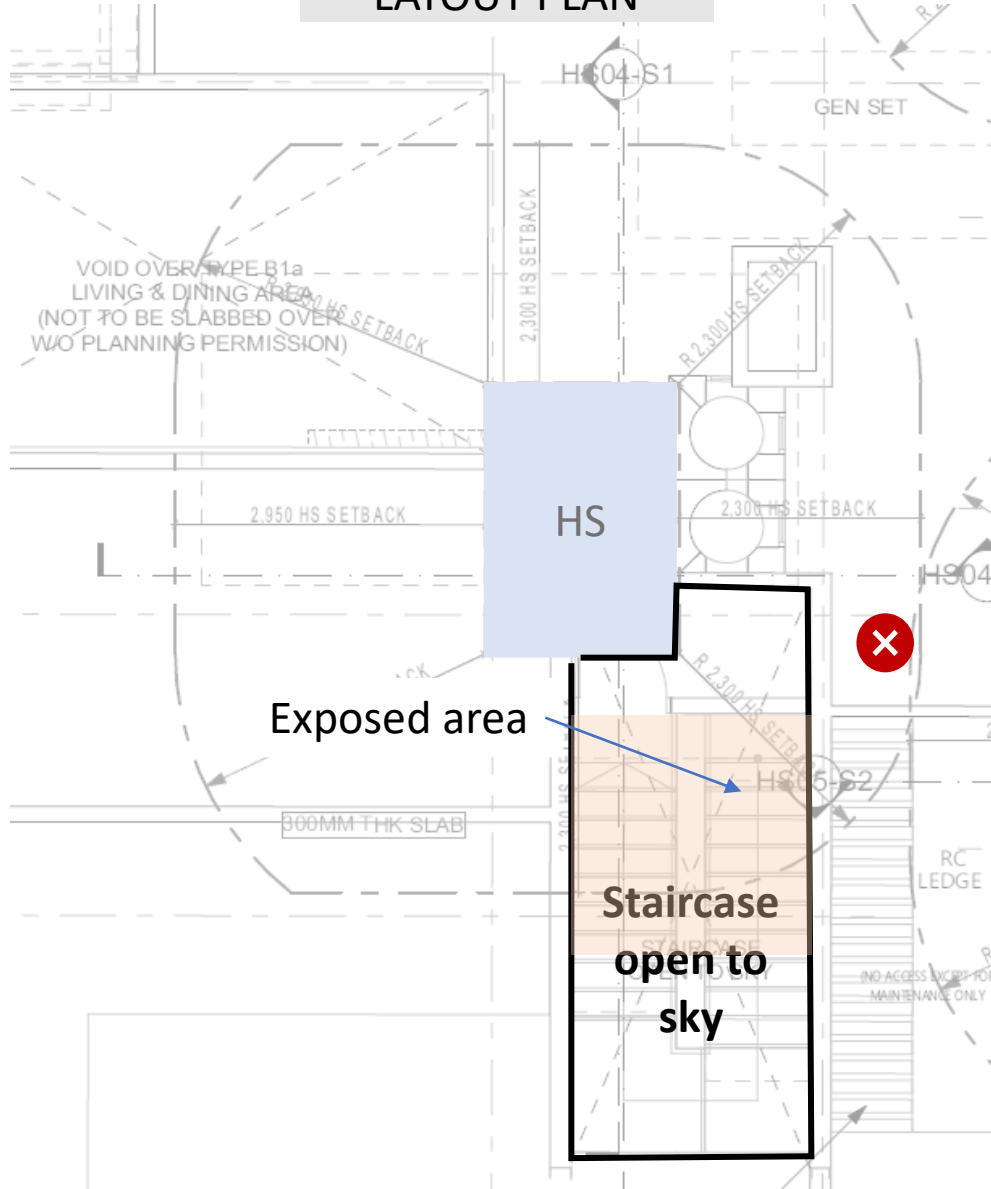


Note: 

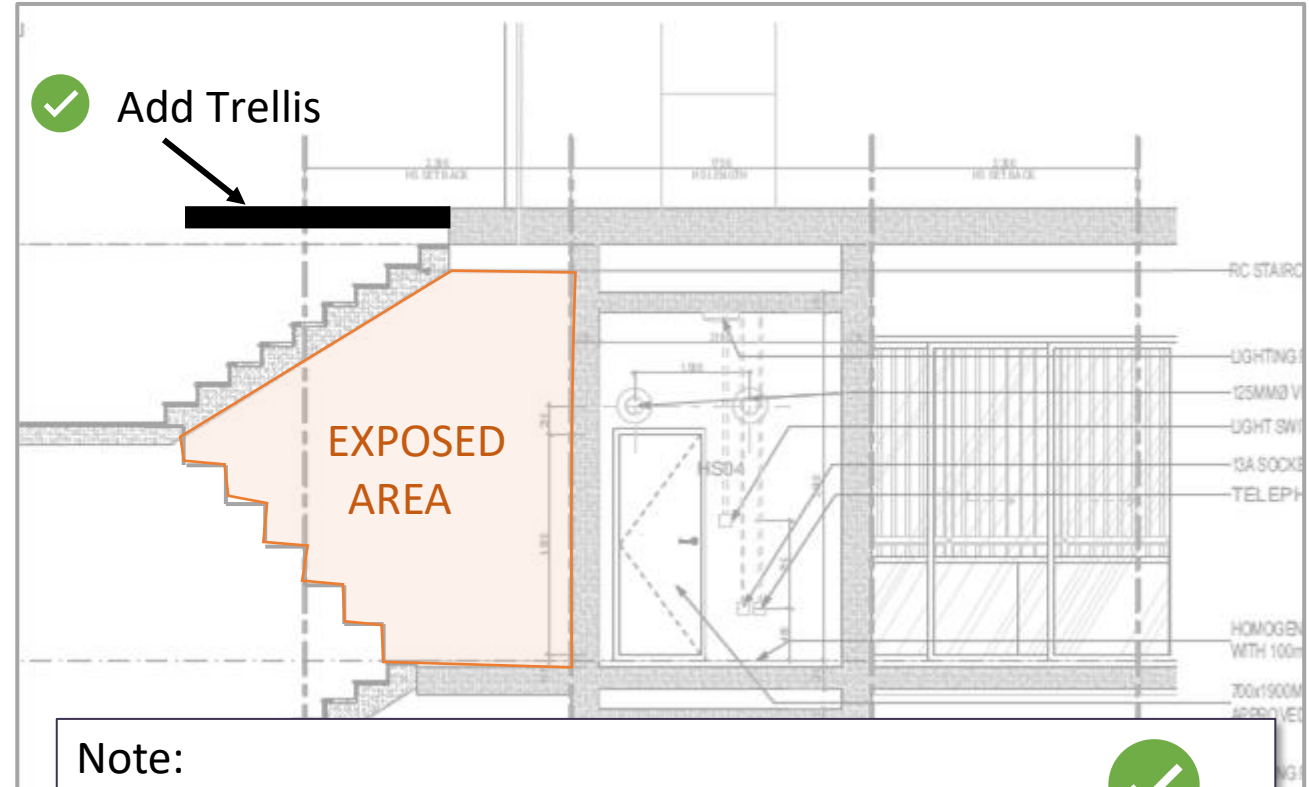
For common wall between MV and SS, the wall thickness shall comply with the SS wall requirement.

SHELTER LOCATION WITH INSUFFICIENT PROTECTION

LAYOUT PLAN



SECTION PLAN



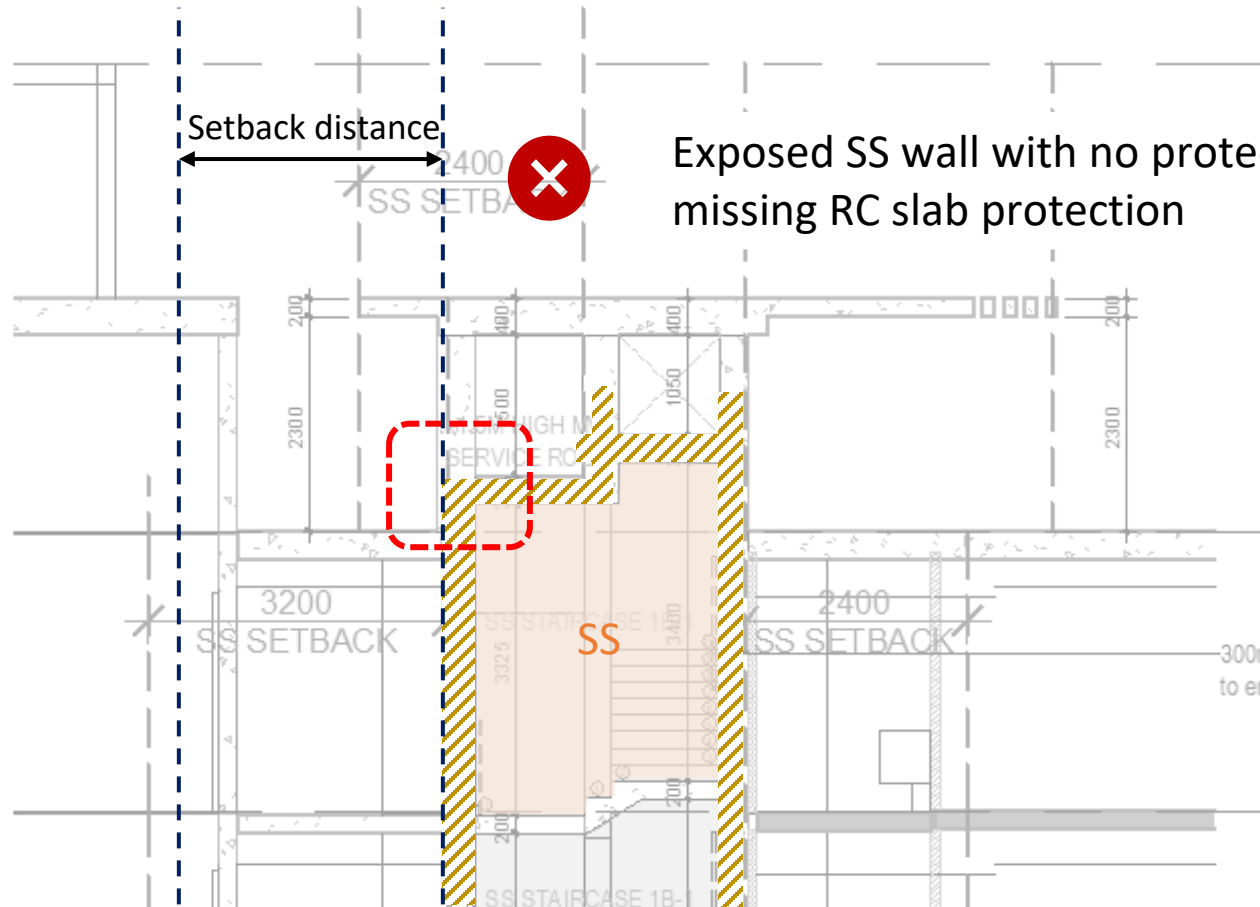
Note:

Staircase open to sky within setback distance:

- Cl. 2.4.9
- Open to sky staircase is not encouraged.
- Part of HS wall is exposed; to provide protection, ie. Trellis at 1m of HS wall.
- Location of RWDP

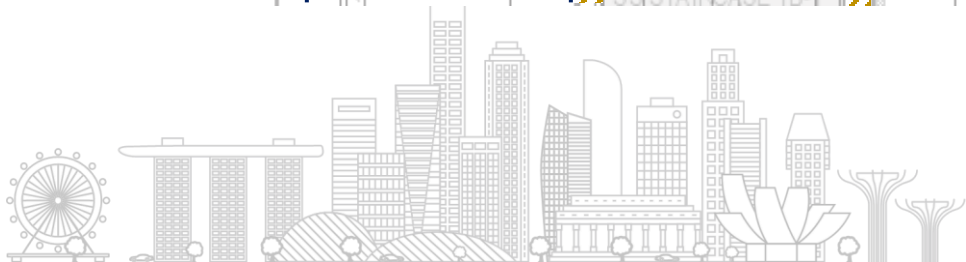


SETBACK DISTANCE NOT COMPLIANT

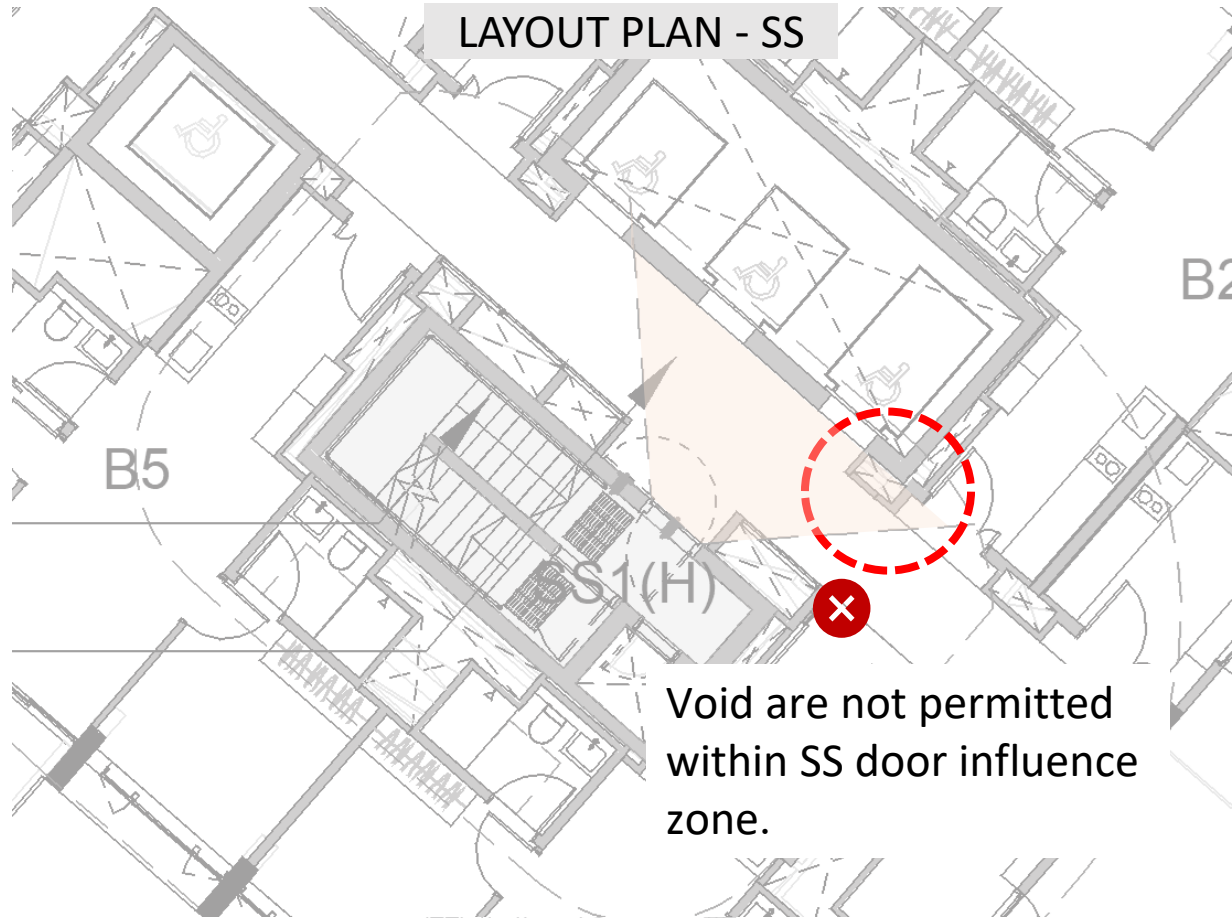


Note:

Cl.2.4.3(a) The SS walls shall be located at minimum setback distances as shown in FIGURE 2.4.3(a) to 2.4.3(c) and shall comply with TABLE 2.4.3.



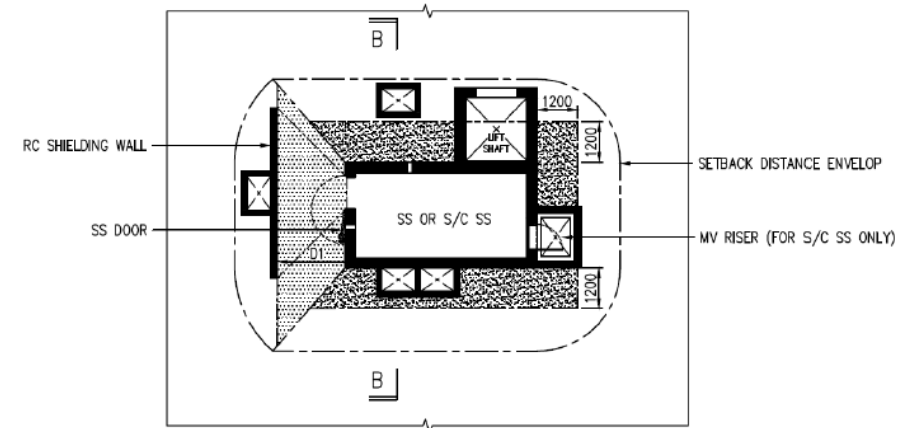
VOID IN FRONT OF SS DOOR IS NOT COMPLIANT



Note:



- 1) Fig.2.4.6 Void shall be located beyond influence zone complying with Cl. 2.4.6



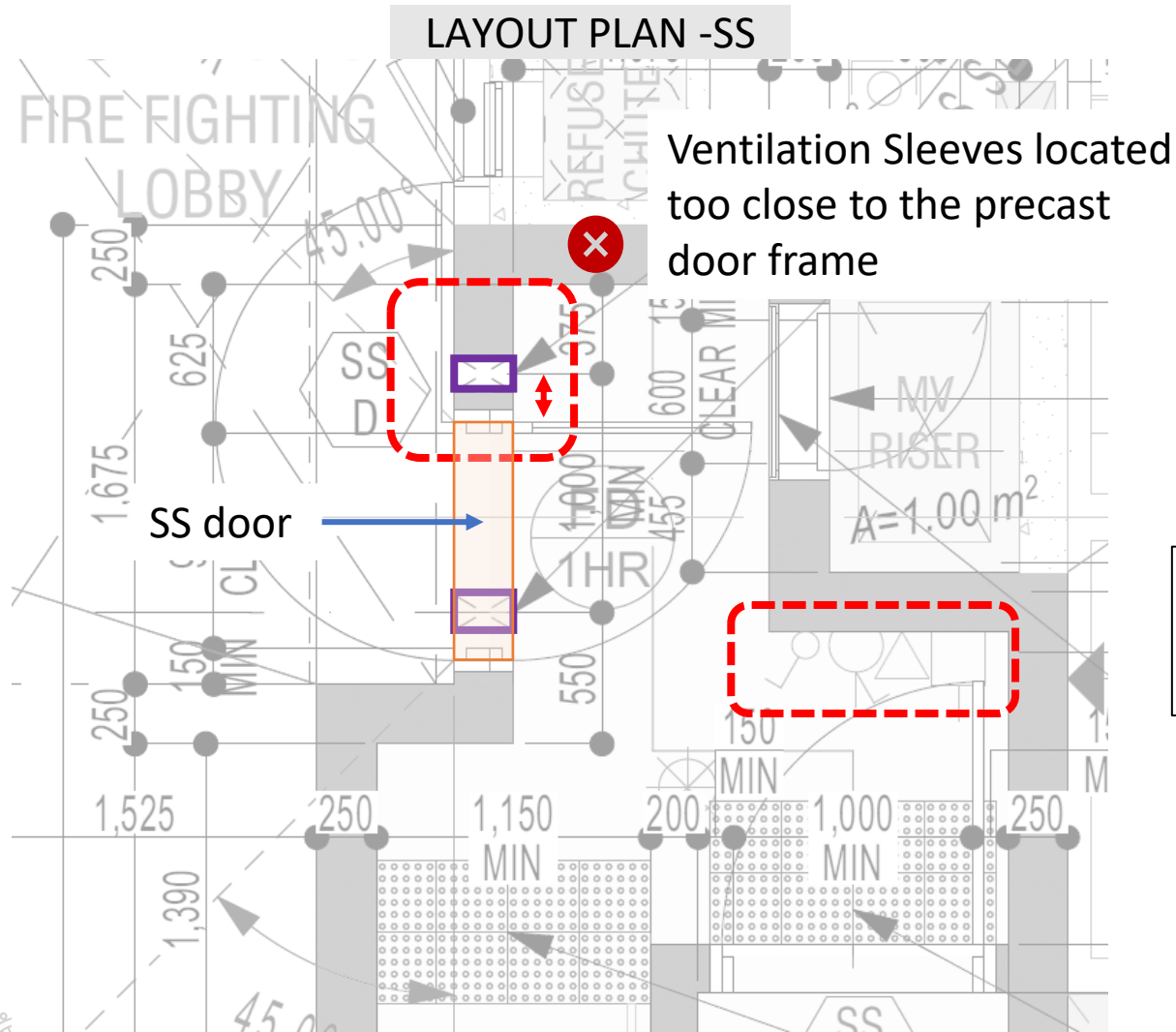
TYPICAL STOREY PLAN

NOTE:

- 1) [Pattern] - 1200mm ZONE
- 2) [Pattern] - NO VOIDS ARE ALLOWED WITHIN THIS SHADED ZONE
- 3) D1 = 1200mm (MIN) AND 3000mm (MAX)
- 4) EBL = EXTERNAL BUILDING LINE
- 5) THE MAXIMUM LENGTH AND AREA OF EACH VOID SHALL BE 1000mm (MAX) AND 0.7m² (MAX)
- 6) VOID LOCATED WITHIN SETBACK DISTANCE FROM SS WALLS (OUTSIDE 45DEG INFLUENCE ZONE OF SS DOOR):
 - i) THERE SHALL BE RC WALL OF AT LEAST 150mm, OR 200mm BLOCK/BRICK WALL.
 - ii) THERE SHALL BE RC WALL OF AT LEAST 150mm, OR 200mm BLOCK/BRICK WALL BETWEEN ADJOINING VOIDS.



VENTILATION SLEEVES TOO CLOSE TO PRECAST SS DOOR FRAME

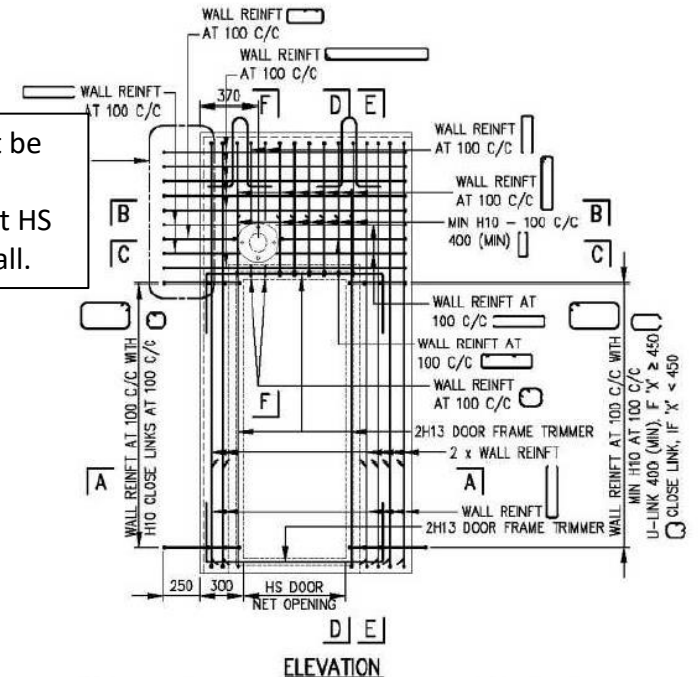


Note:

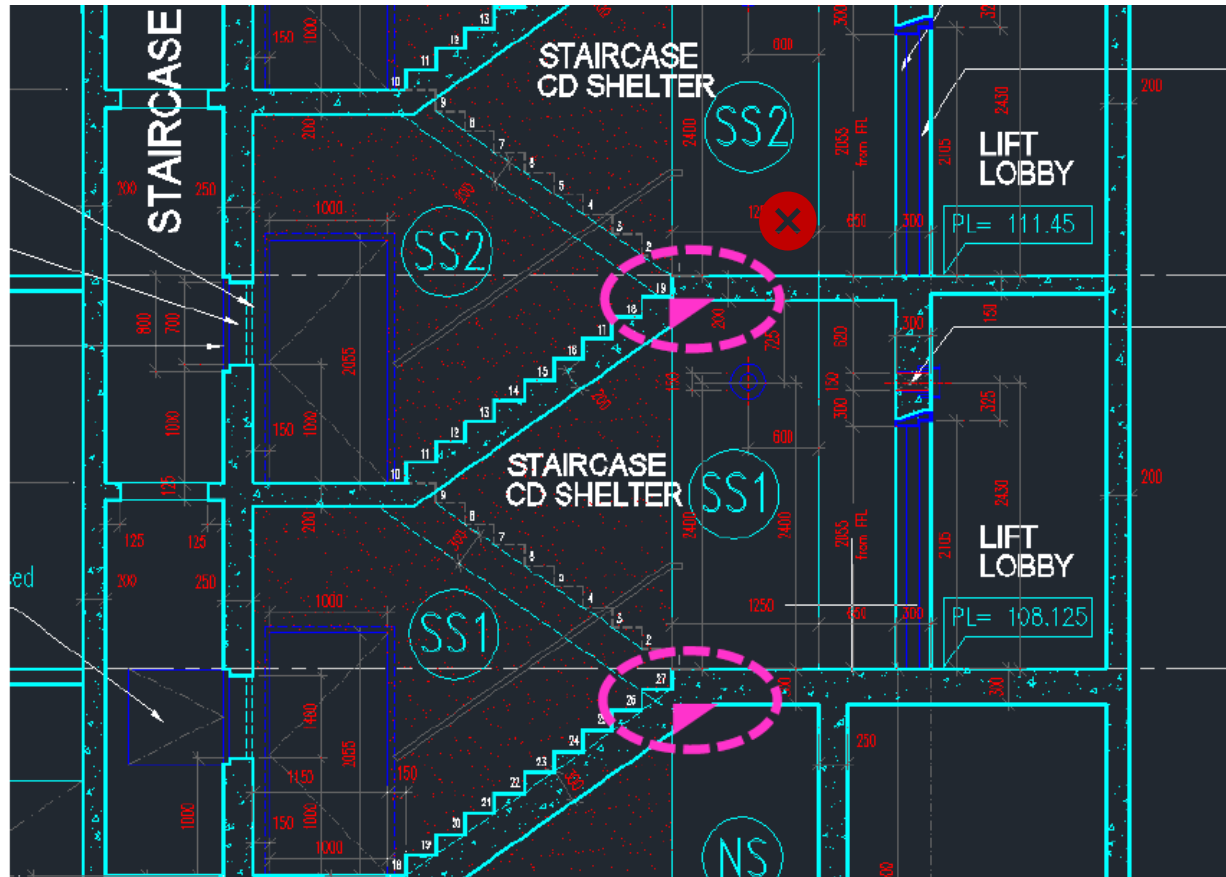


- 1) Distance between center of ventilation sleeve to the edge of precast door frame shall be min. 700mm,
- 2) Electrical features shall be located close to ventilation sleeve.

Ventilation sleeves shall not be located at the zone of connection between precast HS door frame and insitu HS wall.

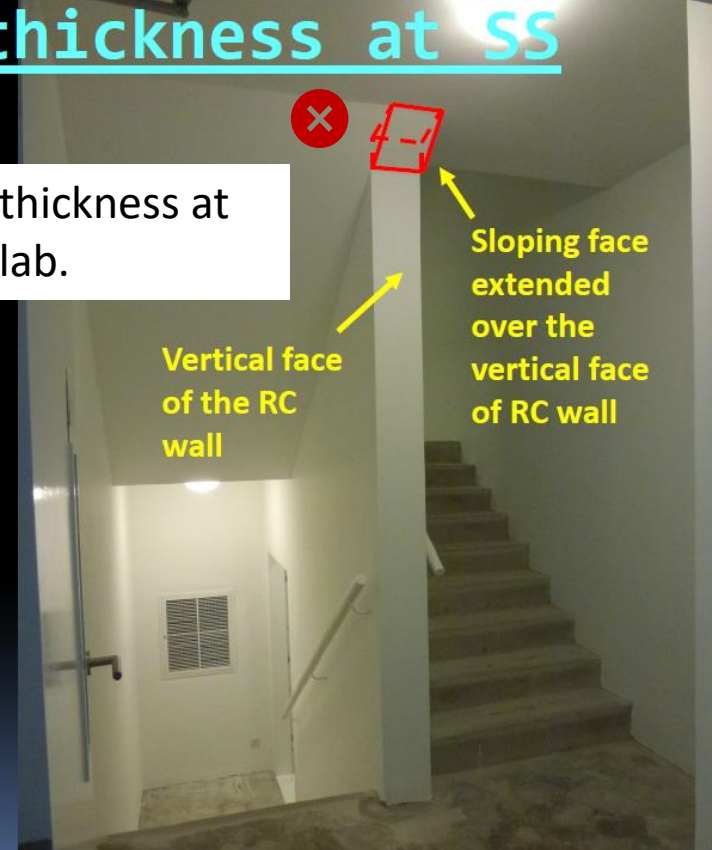


INSUFFICIENT THICKNESS AT SS LANDING SLAB

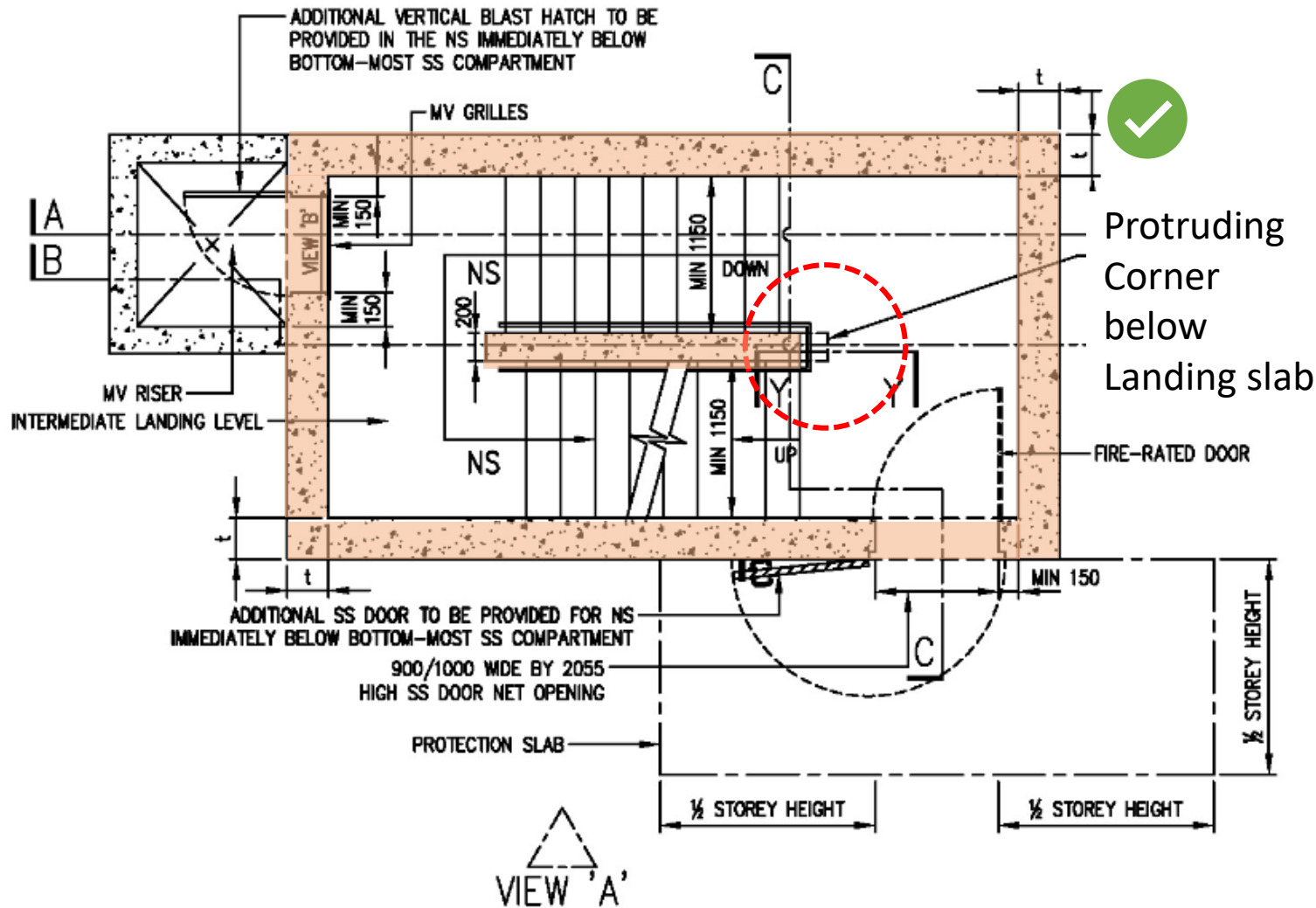


Insufficient thickness at SS landing slab

- Insufficient thickness at SS landing slab.
- The sloping face of the staircase flight soffit shall be extended over the vertical face of the RC wall
- This is where the staircase flight projected beyond the vertical face of the RC wall

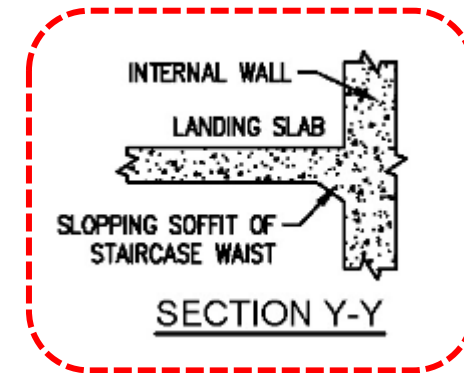


SS SLAB THICKNESS DETAILS



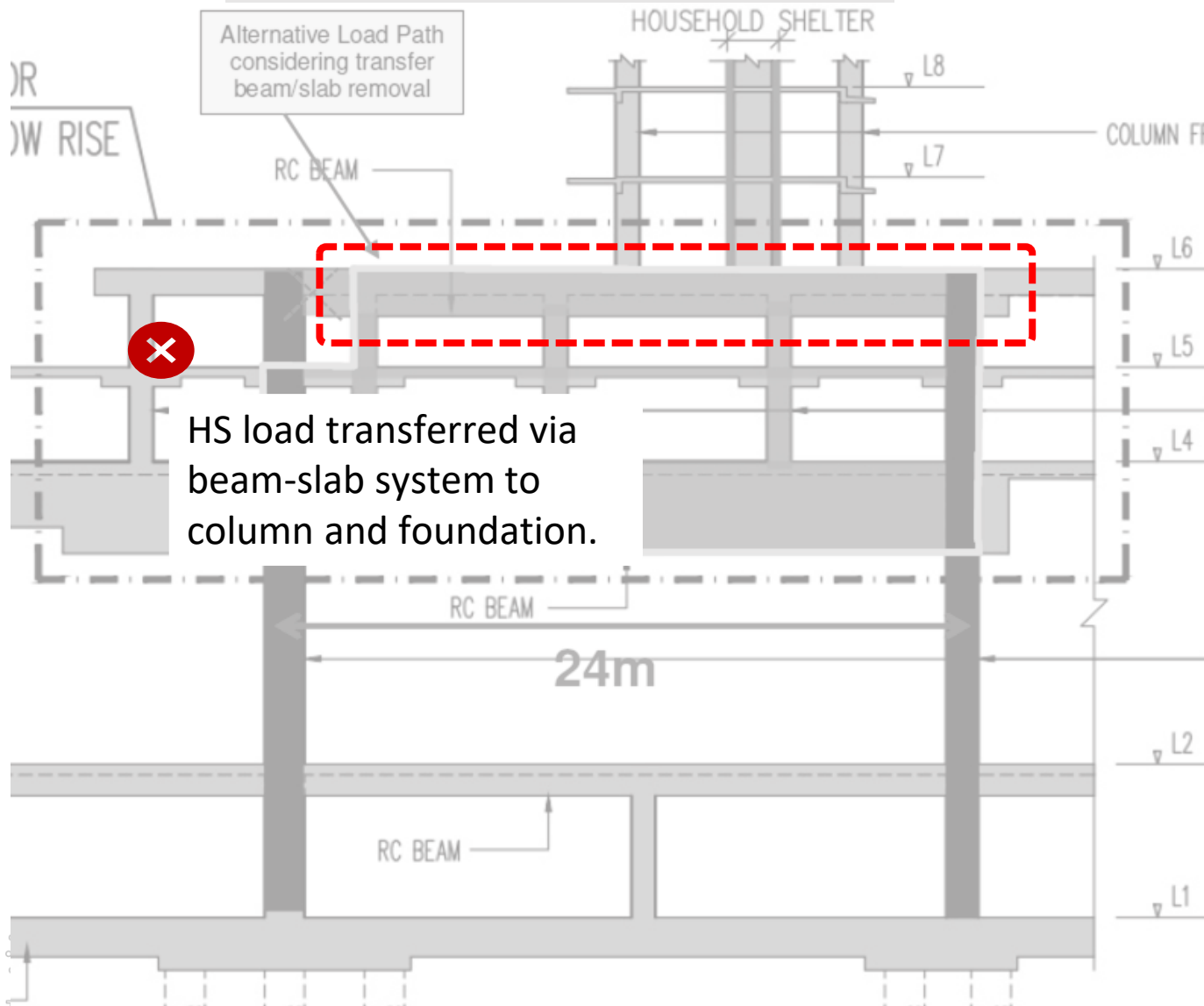
Note:

To ensure an adequate thickness at the staircase landing, a chamfer should be provided at the sloping soffit of the staircase waist.



MULTIPLE TRANSFERS OF HS LOADS IS NOT ALLOWED

TRANSFER SYSTEM DIAGRAM-HS



Note:



- 1) HS load shall be transferred directly to the foundation through beam **OR** thick slab.
- 2) Cl. 2.9.1(c) Only one transfer of HS loads in each tower by the transfer structure to its supporting columns and/ or walls is allowed. Multiple transfers of HS loads from the same HS tower are not allowed.

Good Practices on CD Shelter Submission



✓ **STANDARDIZE HS/SS DETAILS**

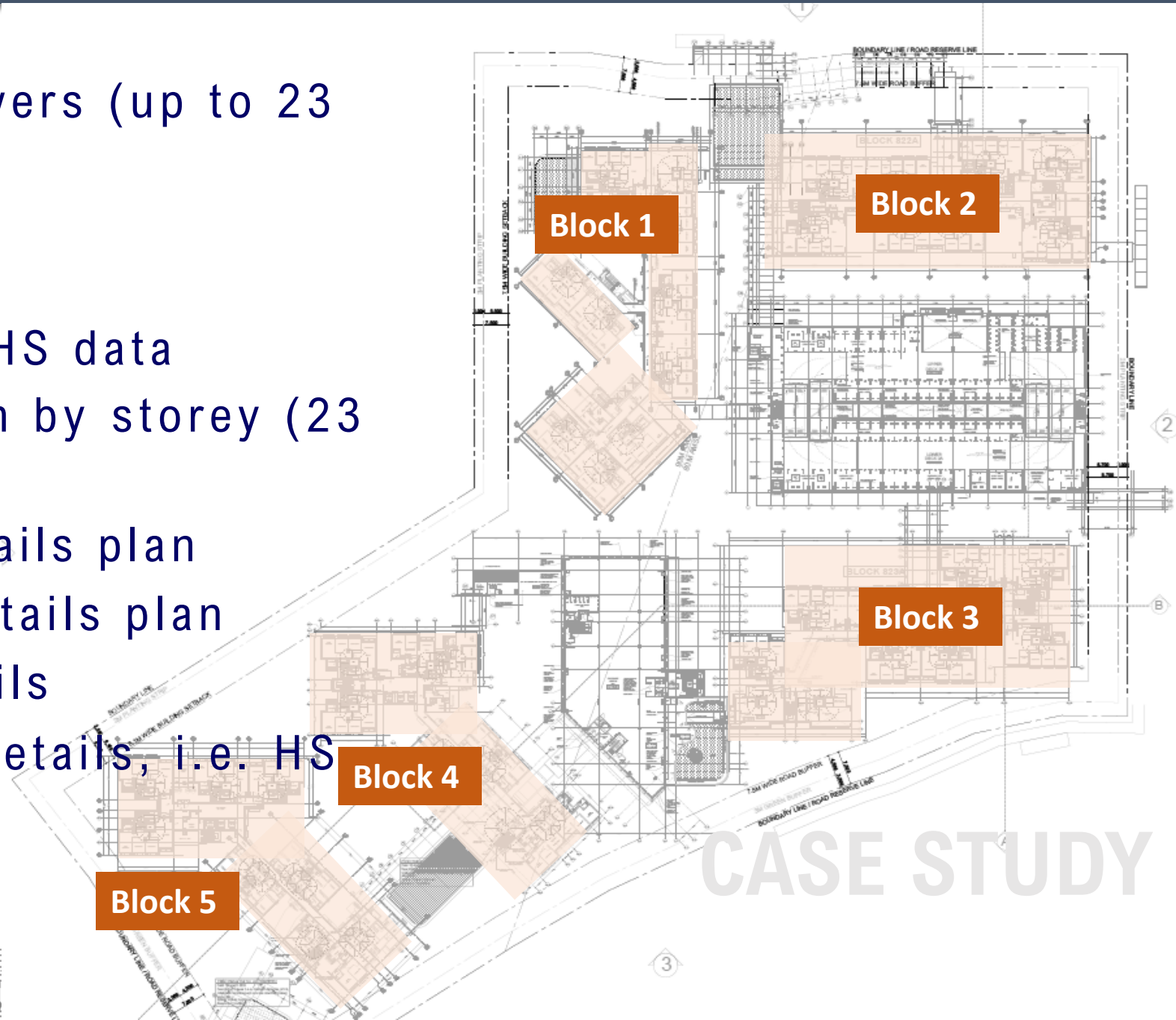
- Categorize HS/SS with similar designs to promote consistency
- Minimize repetitive details to reduce drafting errors.

✓ **STREAMLINING HS/SS DRAWINGS**

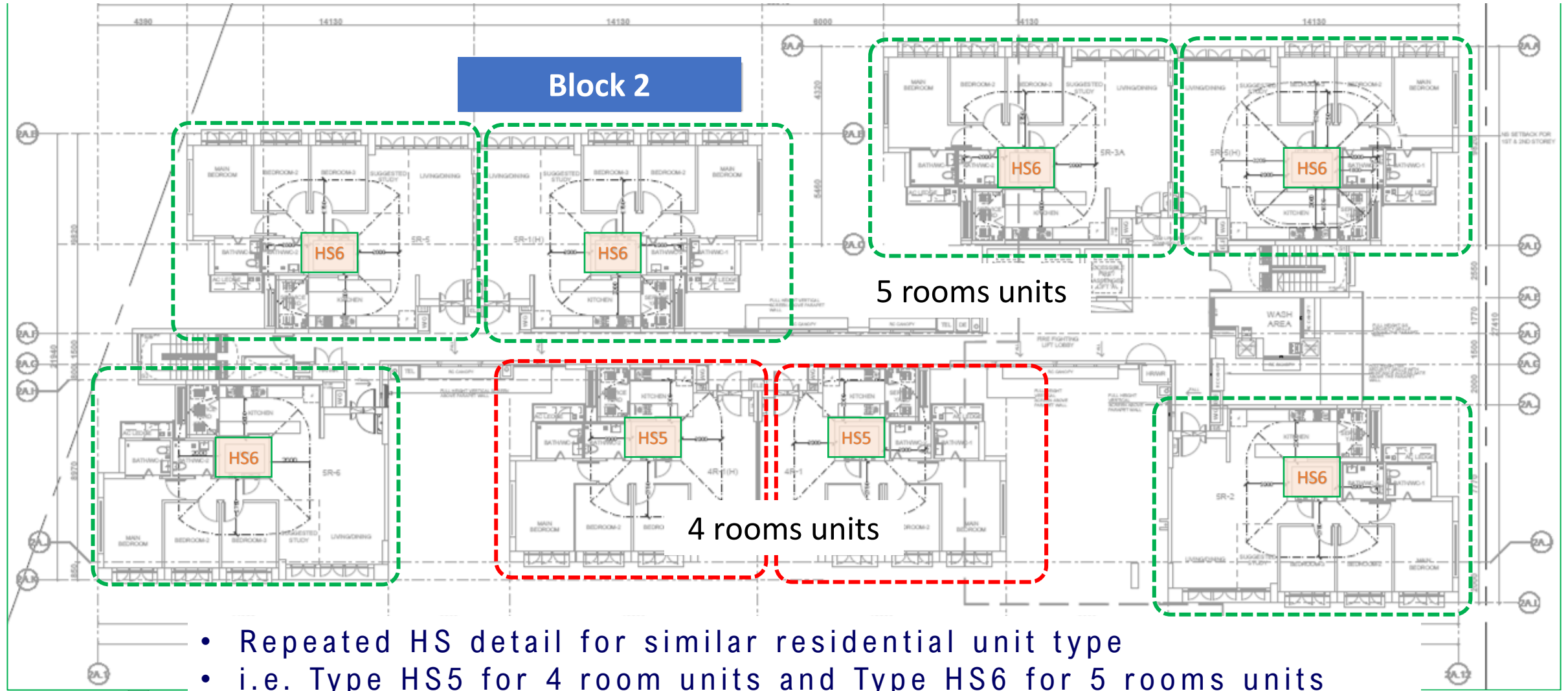
- Present HS/SS within typical unit types with the same surrounding setback scenario as one typical type to reduce the volume of drawings.
- Consolidate typical HS/SS details and sections into one standard type, while highlighting differences in setback distances separately.



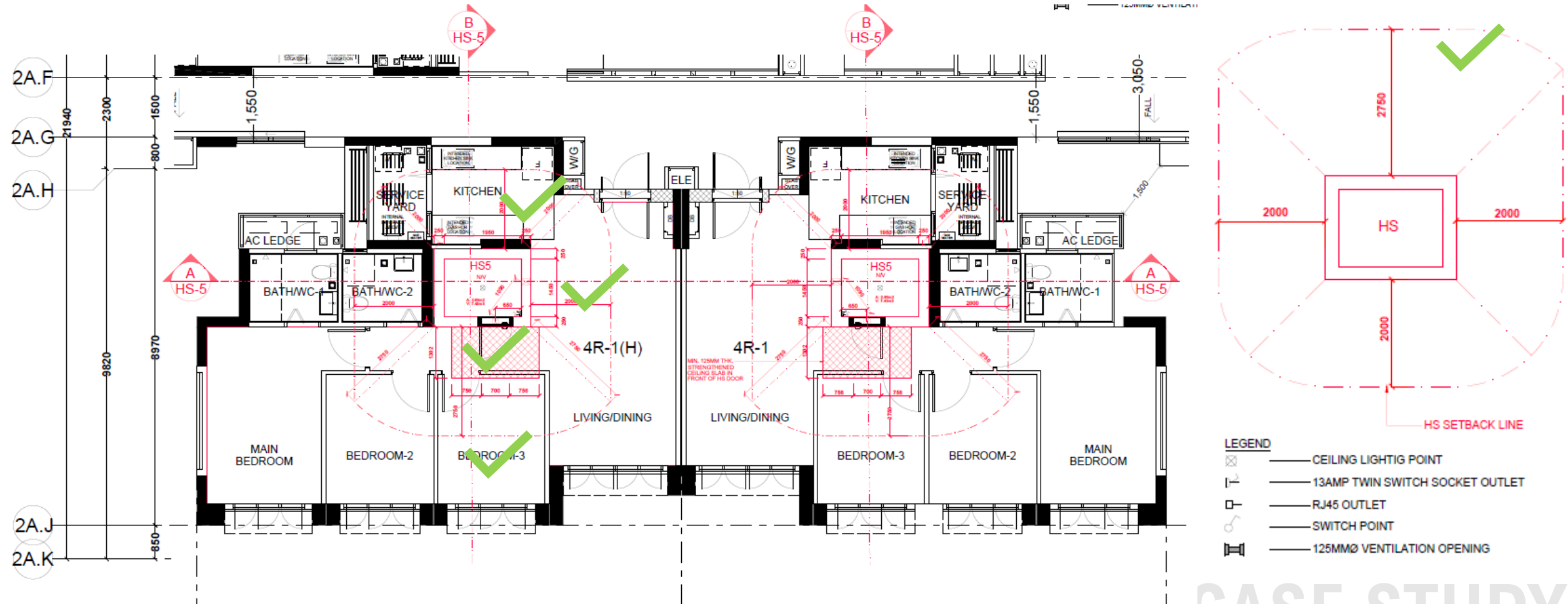
- HDB Project
- 5 Blocks of Residential towers (up to 23 storeys)
- Total 987 residential units
- Total (36) HS drawings
 - (1) Site plan including HS data
 - (16) Overall Layout Plan by storey (23
 - (3) Elevation plans
 - (7) HS1-HS7 layout details plan
 - (7) HS1-HS7 section details plan
 - (1) Precast Hollow details
 - (1) Household Shelter details, i.e. HS door



OVERALL LAYOUT PLAN BY STOREY



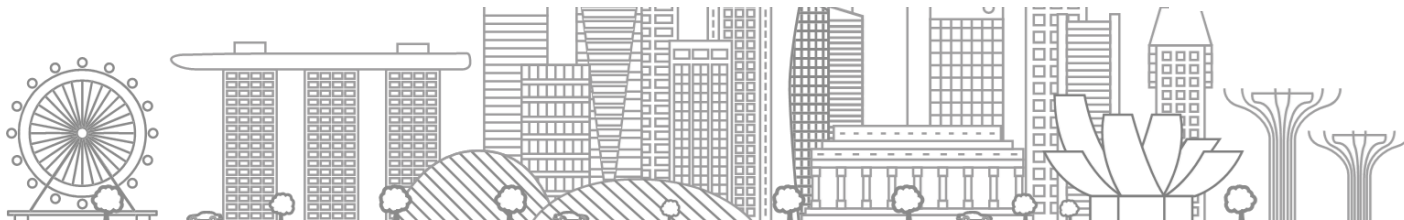
Standardized HS5 layout details



DETAIL OF HOUSEHOLD SHELTER (TYPE HS5) - 4RM @ Block 1,2,3,4 & 5

- LEGEND**
- CEILING LIGHT POINT
 - 13AMP TWIN SWITCH SOCKET OUTLET
 - RJ45 OUTLET
 - SWITCH POINT
 - 125MMØ VENTILATION OPENING

CASE STUDY



Standardized HS5 Section Details

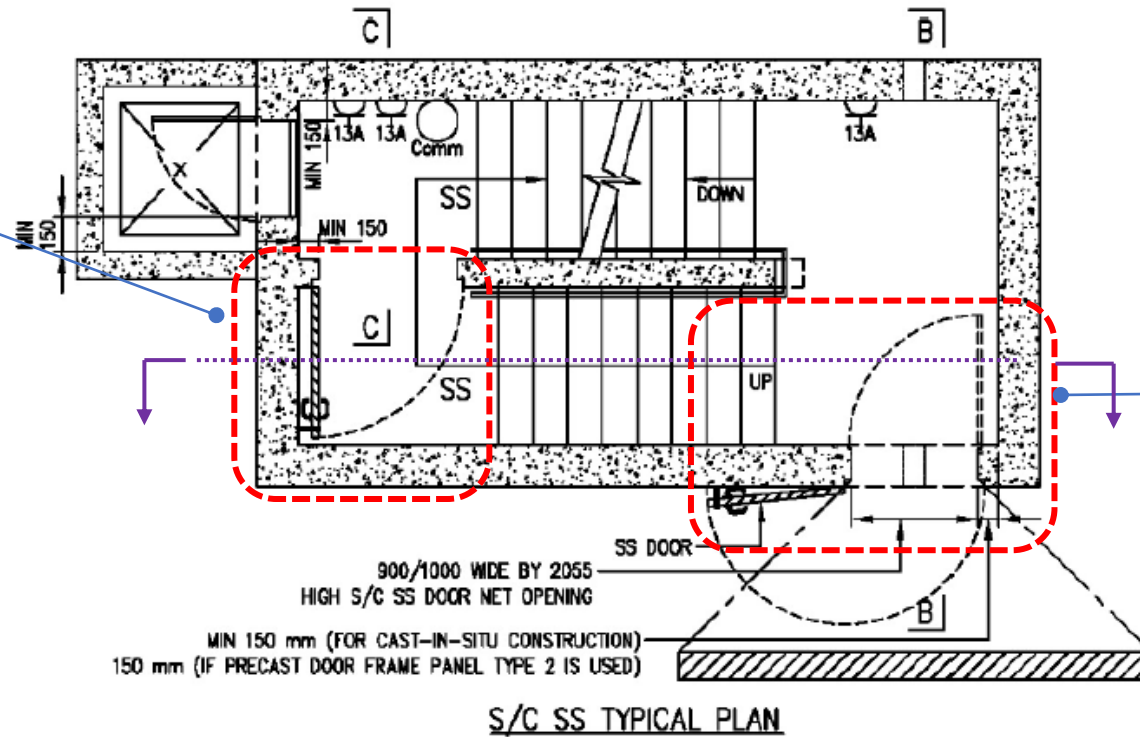


CASE STUDY



SS TYPICAL DESIGN

- ✓ Internal SS door at staircase Landing
- ✓ Allow staircase flight to maintain min. width without affected by the door.
- ✓ Opening direction not implicated by the exit travel direction.
- ✓ Sufficient door swing space.
- ✓ Internal door to swing at oppose to MV to allow airflow during peacetime.

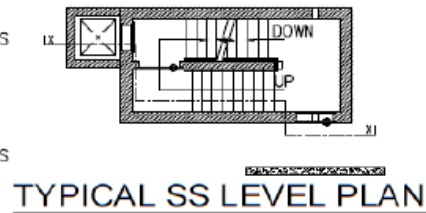
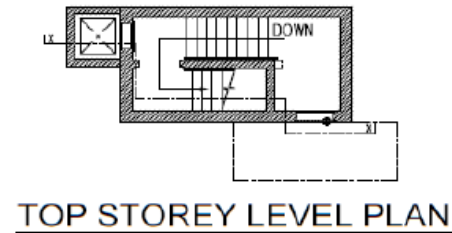
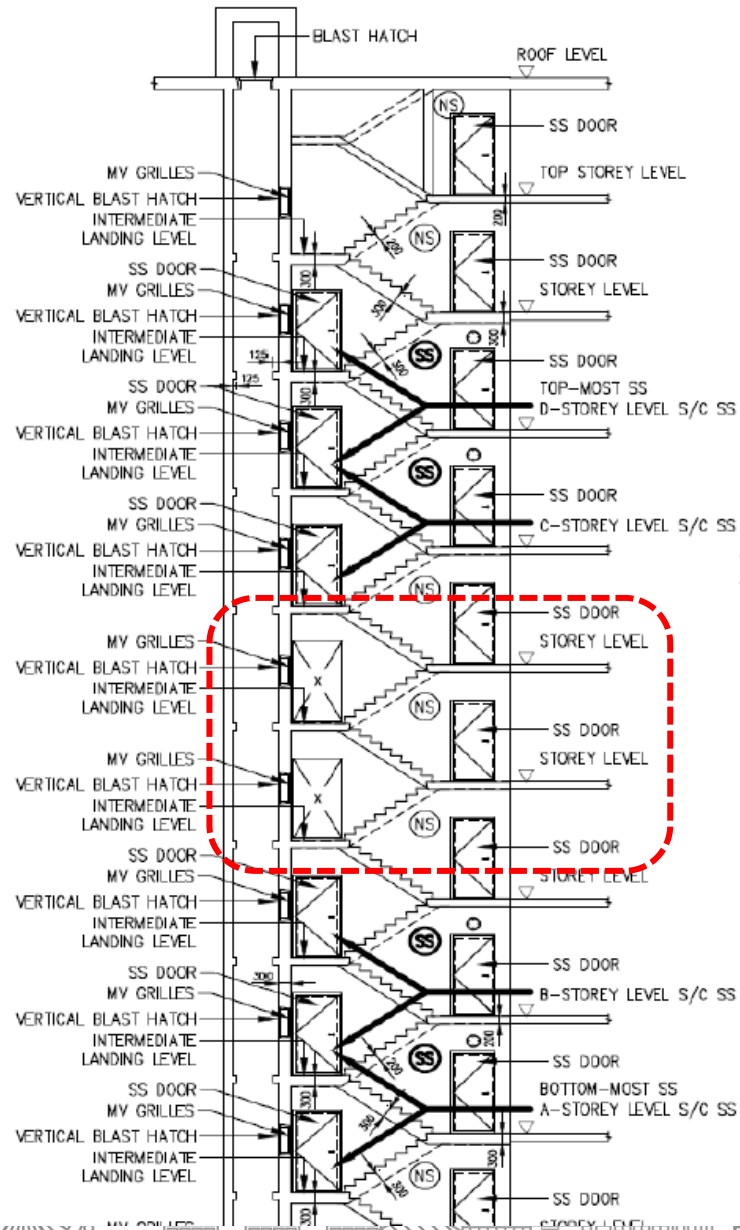


- ✓ SS door at exit direction
- ✓ Clear indication of SS compartmentation

FIGURE 2.5.3(c): CONCRETE WALL SEGMENT AT S/C SS DOORS AND BLAST HATCH



SS TYPICAL DESIGN



Note:



The doors are clearly indicated, along with the MV shaft, to minimize drafting errors that may occur if the doors were located in a different direction.

This will result in a neater design.

TRHS 2023



Building and Construction Authority



2023 Edition

**TECHNICAL REQUIREMENTS
FOR
HOUSEHOLD SHELTERS**

Downloadable from the link below:

scdf.gov.sg/docs/default-source/scdf-library/fssd-downloads/technical-requirements-for-household-shelters-2023.pdf



Building and Construction Authority



**TECHNICAL REQUIREMENTS
FOR
STOREY SHELTERS
2021**

Downloadable from the link below:

scdf.gov.sg/docs/default-source/scdf-library/fssd-downloads/technical-requirements-for-storey-shelters-2021.pdf

- ✓ TRHS 2023 took effect from 1 October 2023.
- ✓ TRSS 2021 took effect from 1 June 2022.
- ✓ The latest TRHS and TRSS were updated to ensure relevance and providing more design flexibility to the building industry by regularizing past circulars.



Thank You



@BCASingapore



Accessibility and Universal Design

Ar. LIN LIN

Senior Architect

BUILDING PLAN & UNIVERSAL DESIGN DEPARTMENT
BUILDING PLAN & MANAGEMENT GROUP



Agenda

Part 1 Regulatory Requirements & Observations

1.1 Basic Accessibility Legislation (BAL)

1.2 Common Observations

Part 2 UDi & AF

2.1 Universal Design index (UDi)

2.2 Accessibility Fund (AF)



Part 1: Regulatory Requirements & Observations

Basic Accessibility Legislation (BAL)



Basic Accessibility Legislation (BAL)

Legislation

- **Mandatory accessibility** upgrading in existing buildings undergoing A&A that require plans submission to BCA
- BCA's Circular on *BASIC ACCESSIBILITY IN EXISTING NON-BARRIER-FREE BUILDINGS* (issued 1 March 2023, came into force since **1 June 2023**)
- *Understanding Basic Accessibility Legislation Booklet (2023)*

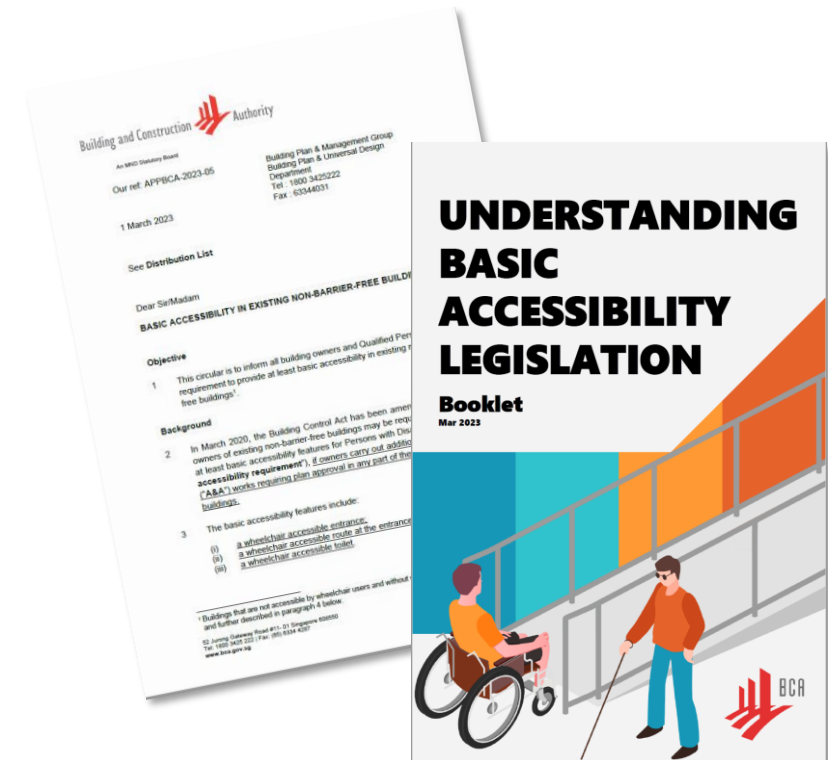
BAL Notice

- A Notice To Provide Basic Accessibility Features for mandatory upgrading will be issued to the building owners if the A&A works to existing non-barrier free building triggers building plan submission to BCA (including **ST** and **BP** submissions)

Applies to:

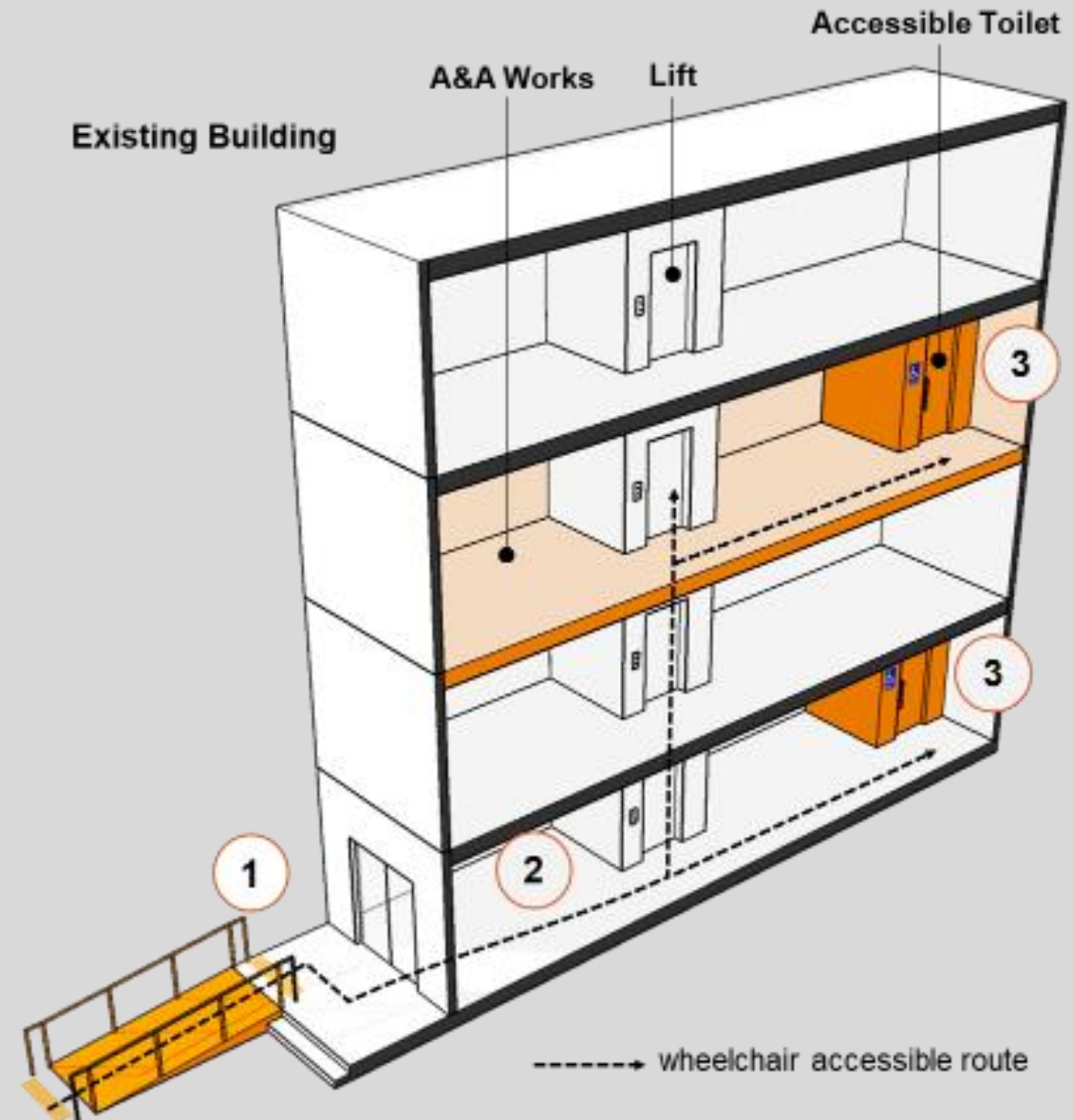
Existing Buildings

- Accessible by the **public**
- Not solely residential or factory use
- Building's GFA of more than **500 sqm**



Basic Accessibility Features

- ① wheelchair accessible entrance
 - ② wheelchair accessible route at the entrance level
 - ③ wheelchair accessible toilet
- QPs may consult BCA should the project encounters exceptional constraints and seek alternative solutions



Example: Where A&A works are carried out at the 3rd storey of an existing building, basic accessibility features 1, 2 and 3 have to be provided.

More information about **Basic Accessibility Legislation (BAL)** can be found at:



*BCA's Website for
Basic Accessibility Legislation*
<https://go.gov.sg/bcaud-bal>



*BCA's Circular on
Basic Accessibility In Existing
Non-barrier-free Buildings*
<https://go.gov.sg/bcaud-bal-circular>



*Understanding Basic Accessibility
Legislation Booklet*
<https://go.gov.sg/bcaud-bal-booklet>

Part 1: Regulatory Requirements & Observations

Common Observations

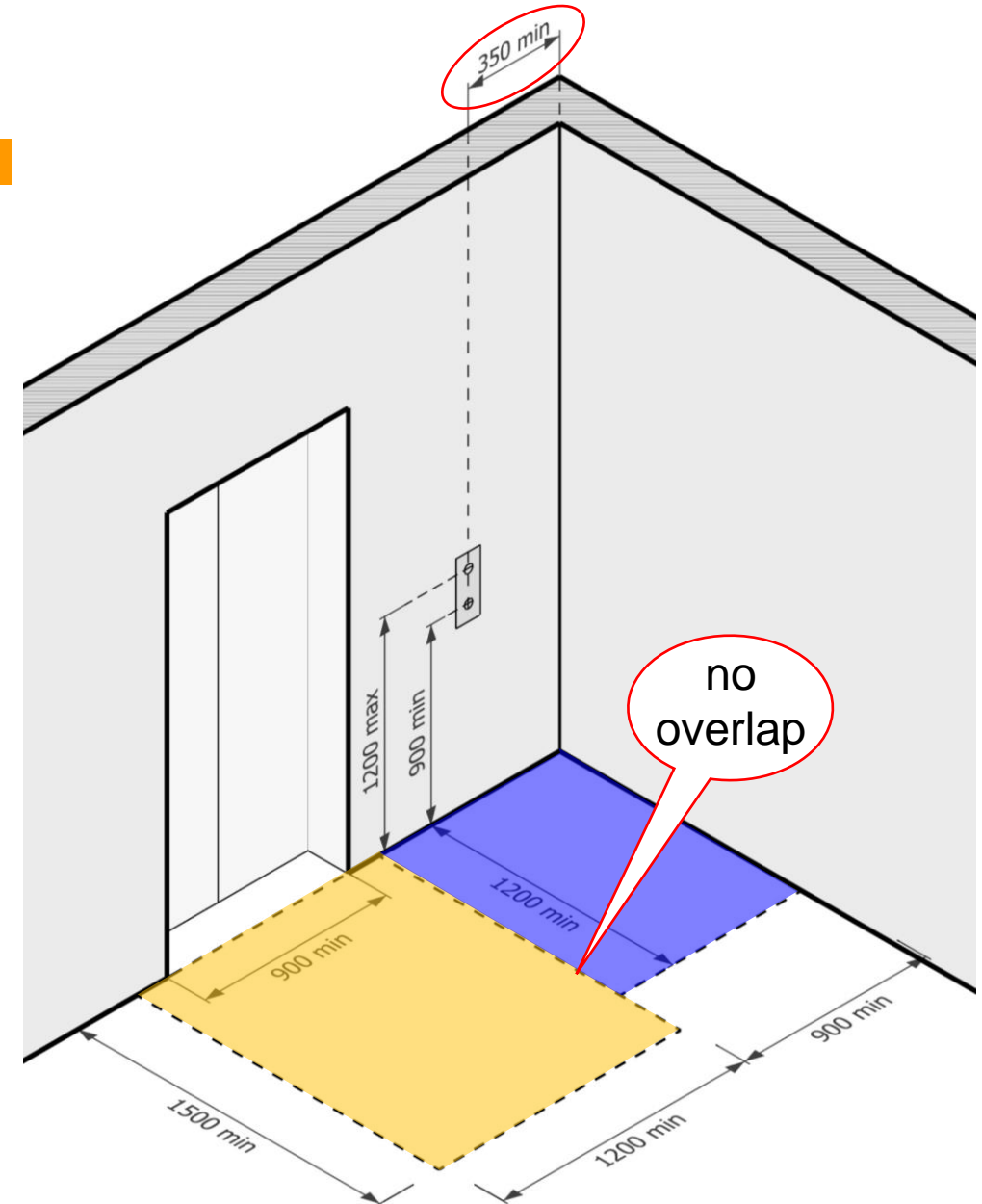


Manoeuvring Space in Lift Lobby

- Clause 4.9.1.3 Lift lobby space with lifts designed for wheelchair users must have a clear manoeuvring space of **1200 mm wide by 1500 mm** deep...
- Clause 4.9.4.1 The lift landing call button located outside the lift must:
 - (a) have a clear floor space of at least **900 mm by 1200 mm** with no obstruction that prevents a wheelchair user from reaching the call button;



- Clause 4.9.4.1 (c) be located at least **350 mm** away from a wall or obstruction;



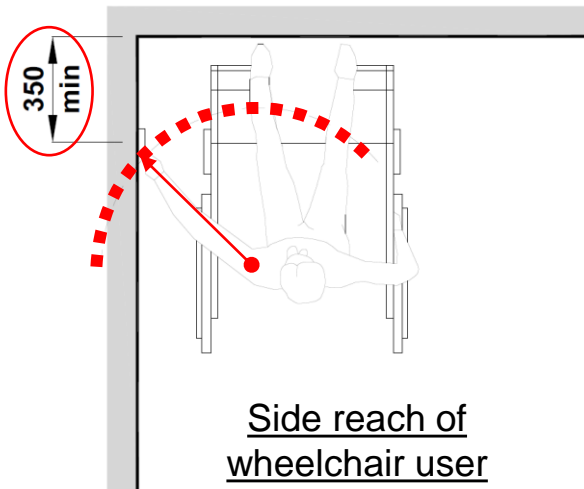
- Adequate wheelchair manoeuvring space should be provided within private lift lobbies of residential development

Accessible Lift Side Control Panel

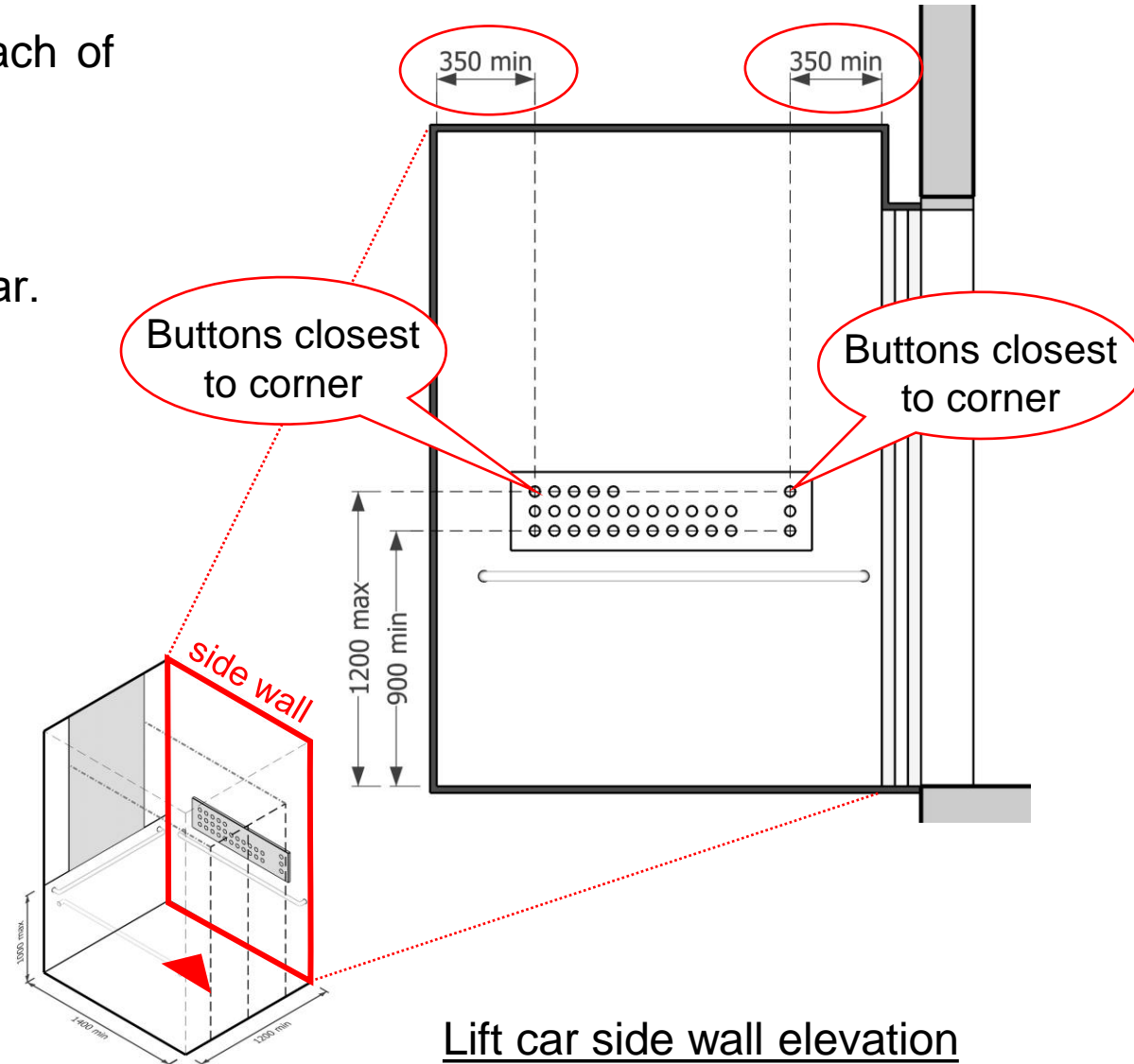


Ensure the lift buttons are within the reach of wheelchair users

Clause 4.9.5.1(c) must have **at least one panel** placed to the **side** of the lift car.



- QPs may seek consultation with BCA should there are technical difficulties to comply with 350mm distance requirement

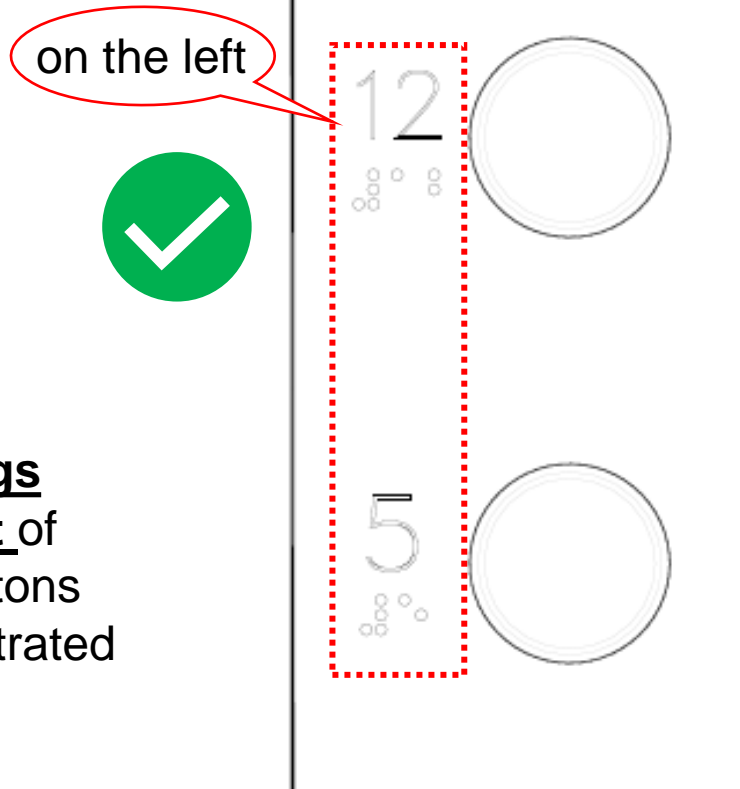


Touch-sensitive Lift Control Buttons



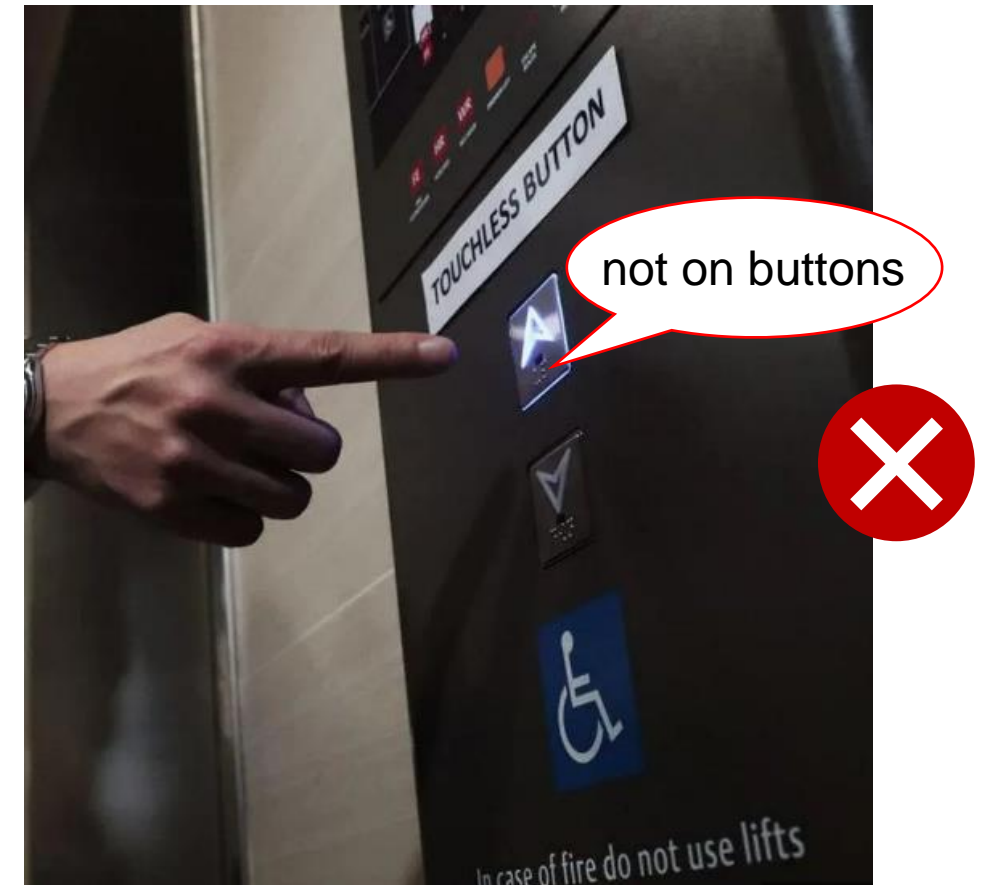
Rationale

Persons with low vision need to touch and feel all the braille and tactile markings to decide which button to press, which will likely trigger all lift buttons unintentionally. The standardised placement of braille and tactile markings on the left of the buttons will help them to locate the floor information more effectively.



Clause 4.8.2.2

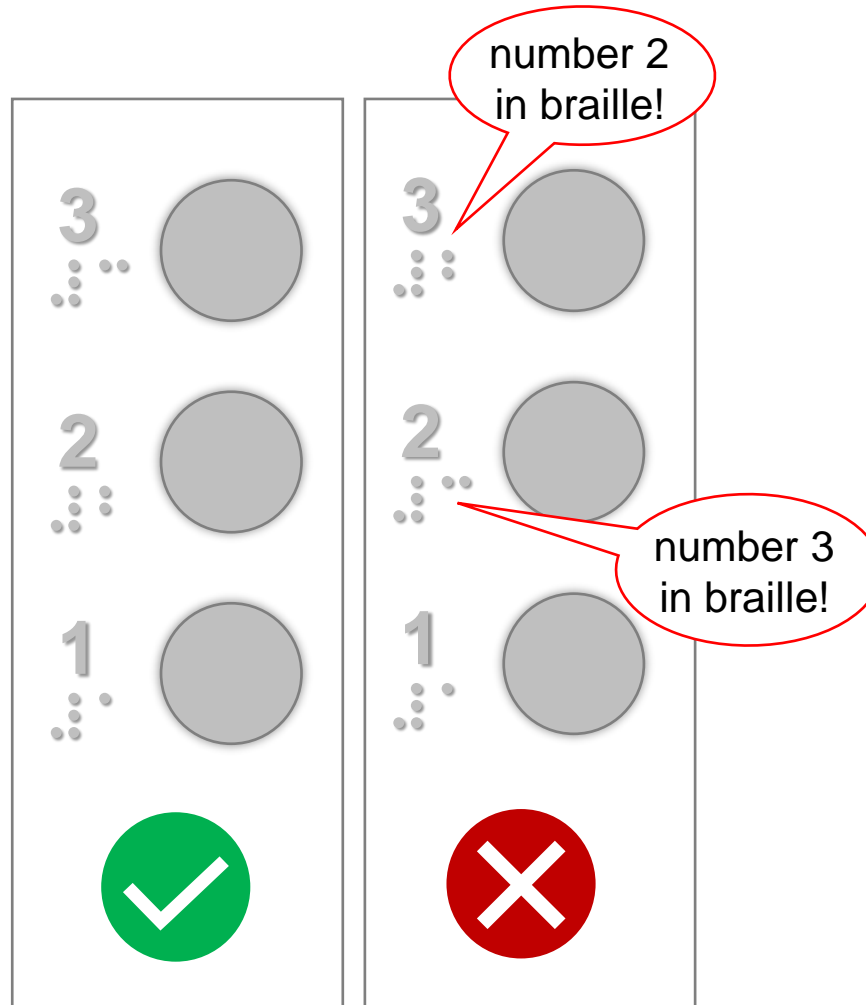
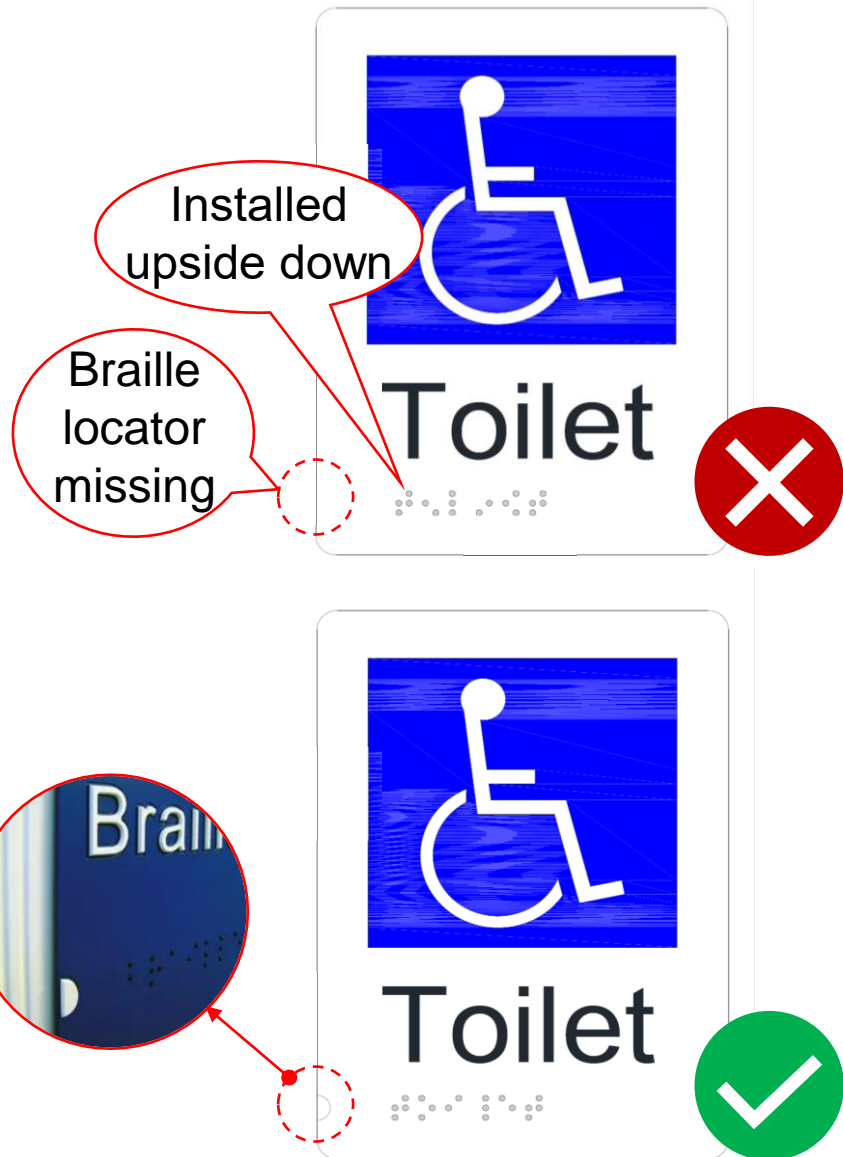
Braille and tactile markings must be provided to the **left** of lift control buttons if the buttons are **touch-sensitive**, as illustrated in Figure 40 (c).



Braille

Correct application of Braille locator and Braille scripts

Commonly used Braille



| English | Braille |
|---------|---------|
| Level | ⠠⠠⠠⠠ |
| Toilet | ⠠⠠⠠⠠⠠⠠ |
| Male | ⠠⠠⠠⠠ |
| Female | ⠠⠠⠠⠠⠠⠠ |
| 1 | ⠠⠠ |
| 2 | ⠠⠠ |
| 3 | ⠠⠠ |
| 4 | ⠠⠠ |
| 5 | ⠠⠠ |
| 6 | ⠠⠠ |
| 7 | ⠠⠠ |
| 8 | ⠠⠠ |
| 9 | ⠠⠠ |
| 10 | ⠠⠠⠠ |

➤ The Singapore Association of the Visually Handicapped (SAVH) provides Braille audit services for Braille scripts on signages, etc

Mirror in Accessible Lift



Rationale

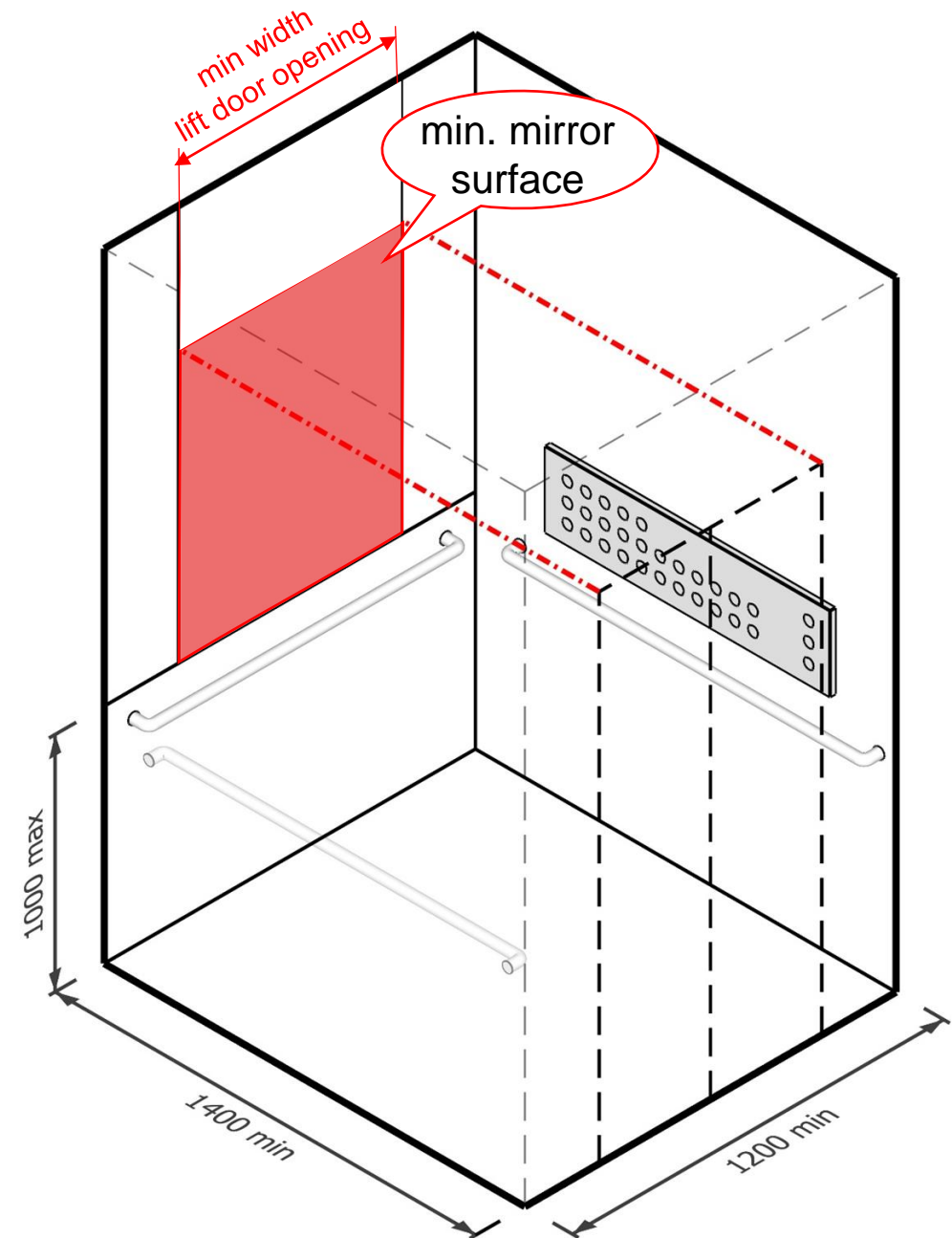
Facilitate wheelchair user to reverse out of the lift safely without having to turn, preventing injury and damage to wheelchair

Clause 4.9.2.2:

The bottom edge of the mirror must not exceed the **maximum height of 1000 mm** from finished floor level of lift car.

Clause 4.9.2.3:

The **minimum width** of the rear mirror must be equal or more than the **width of the lift door opening**.



Stairlift



Rationale

Stairlift typically does not allow independent access and use by wheelchair users. Stairlift also costs more in the long run due to operation and maintenance.

Clause 4.10.3.1

Where it is **impracticable to provide a passenger lift, a ramp or platform lift** in an existing building, a wheelchair stairlift can be considered as a reasonable alternative for vertical circulation within the building.

- Only for existing buildings in exceptional circumstances e.g. site and structural constraints

Usually locked to prevent misuse

Call for assistance?
No response?

How to use this?



Detectable Warning Surface (DWS)



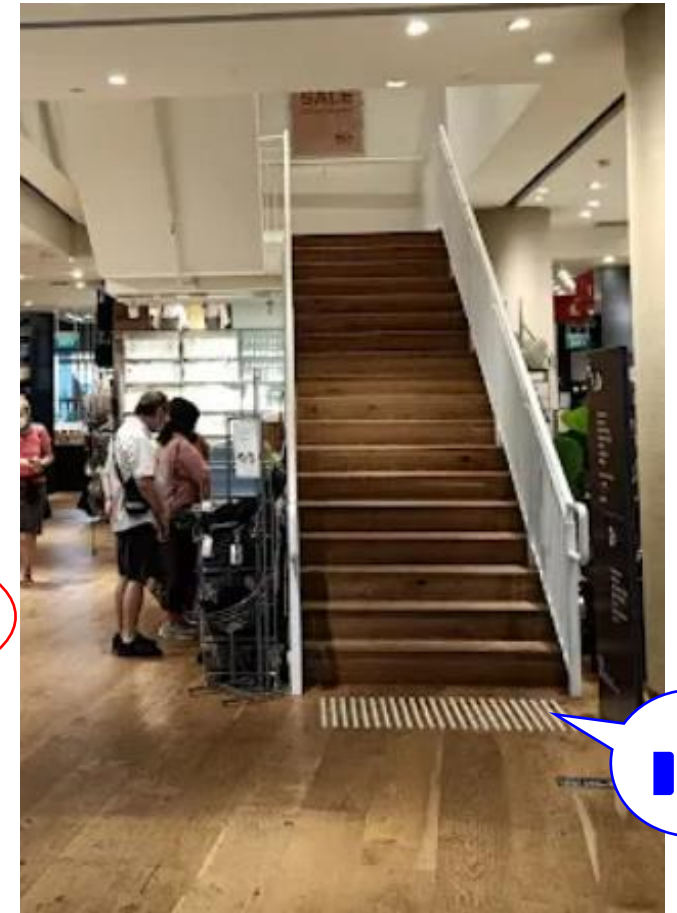
Rationale

DWS is an important feature for the visually-impaired and white cane users to detect hazards such as driveways and stairs. DWS must be provided at top and bottom of **internal staircases** within duplex retail / restaurant units and other places frequented by the public.

Clause 4.11.3.1

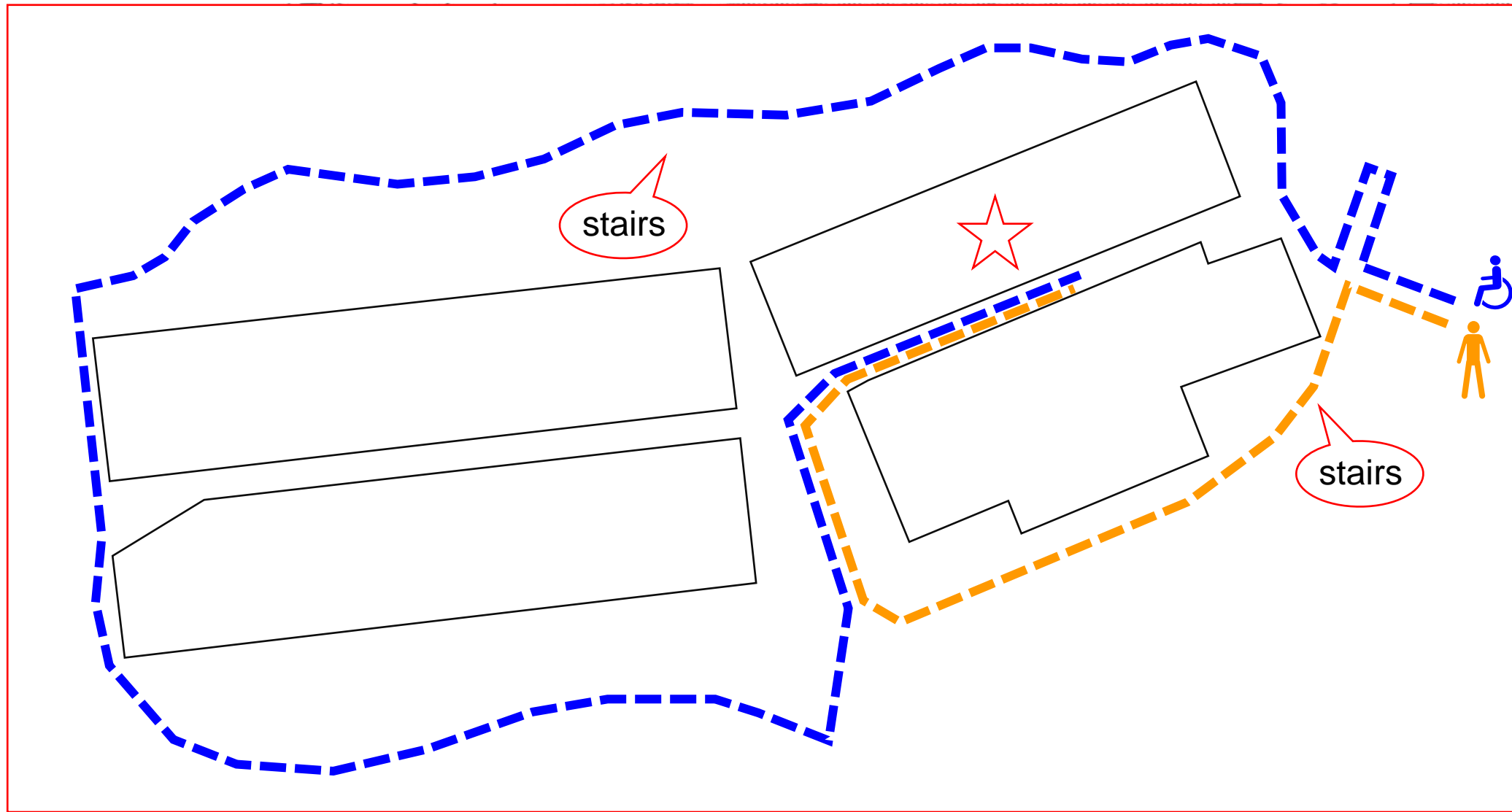
Detectable warning surfaces must:

(a) be provided at the top, bottom and intermediate landings leading to another path of travel;



Equitable Access

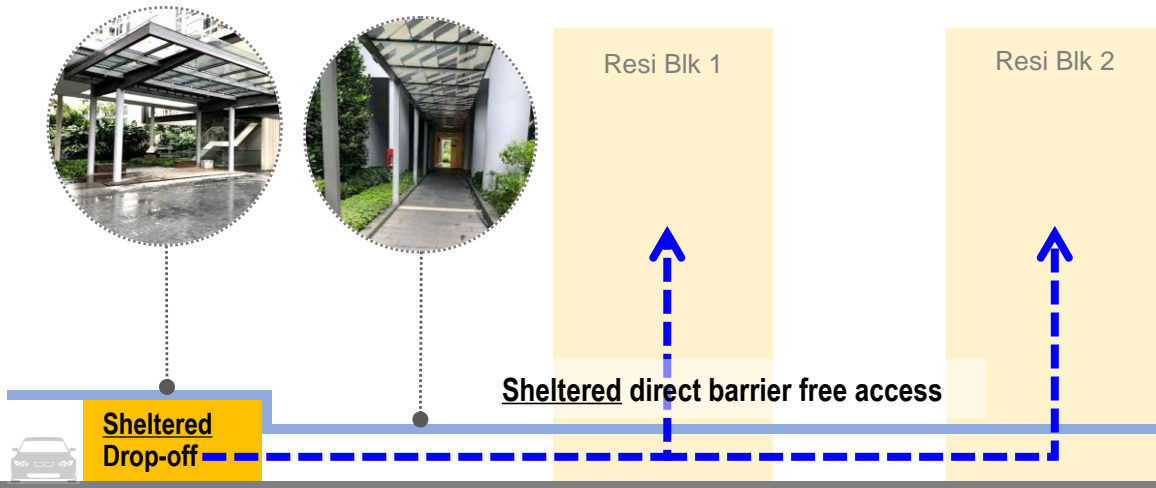
Equitable access for everyone must be considered in the planning and design stage. Direct and convenient access must be provided for wheelchair users and parents with pram.



Sheltered Access

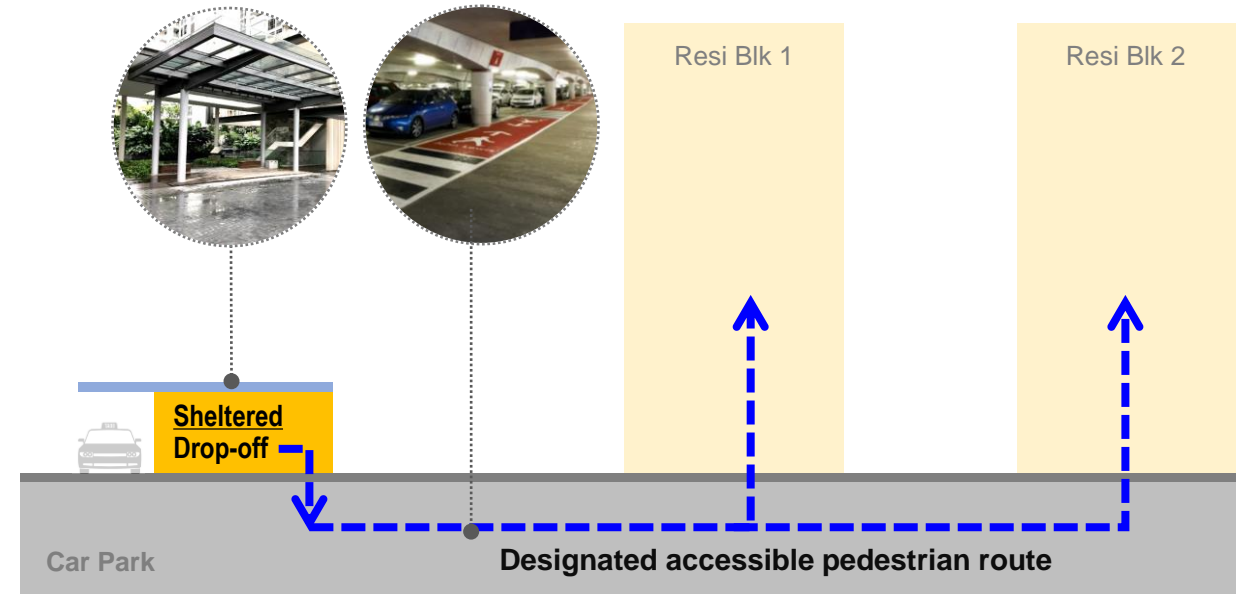
Clause 7.1.1 There must be at least one accessible and **sheltered** passenger alighting and boarding point with **direct access** to every block of the residential development.

(e.g. covered walkway)



Scenario 1 (diagrammatic section)

- Sheltered direct access via covered walkway on grade



Scenario 2 (diagrammatic section)

- Sheltered direct access via **designated accessible route** at car park levels.

Accessible Changing Room

- A wheelchair-accessible individual washroom equipped with changing facilities for use by elderly, adults or older children with disabilities who require the help of caregivers to clean up and change diapers.
- **Not a typical changing room** in a gym or fitting room for trying out clothes



Changing bed for person with disability



Accessible Washrooms Comparison

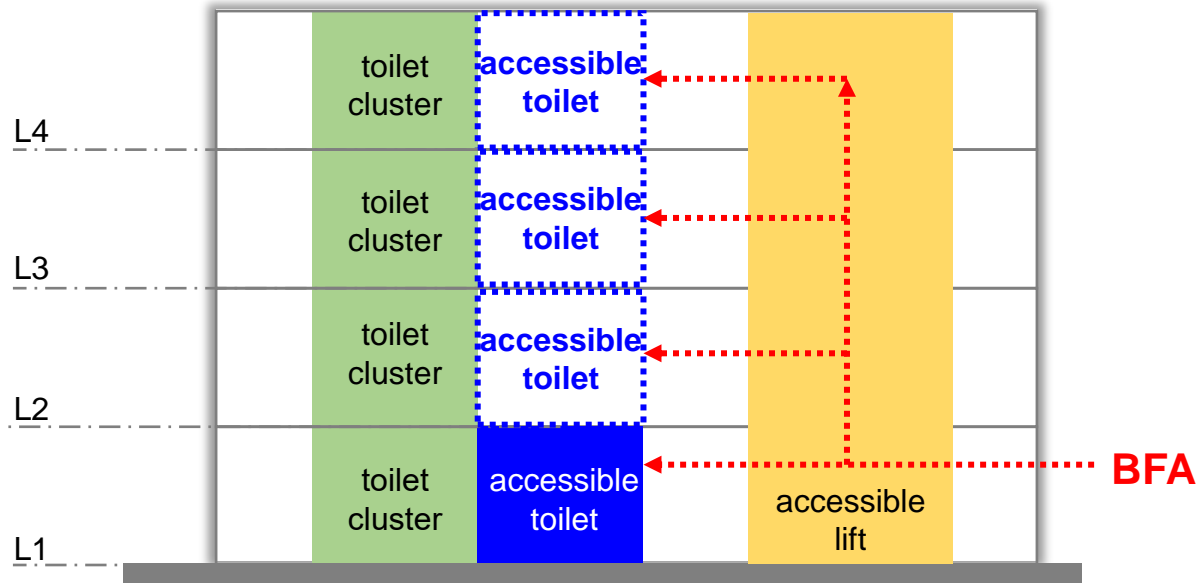
➤ QP to declare correctly in BP / UDi Checklist

| | Accessible Individual Washroom (normal) | Larger Accessible Individual Washroom | Accessible Changing Room |
|--------------------|---|--|---|
| Clause | Clause 5.2, Figure 49 | Clause 5.1.3, Figure 51 | Clause 5.8, Figure 64 |
| Internal Size | 1750 mm X 1750 mm | 1800 mm X 2100 mm | 2600 mm X 2300 mm |
| Space | Clear space: 900 mm X 1500 mm | Clear space: 900 mm X 1500 mm | Clear space: 900 mm X 1500 mm Bed size: 1800 mm X 750 mm |
| Key Points to Note | <p>for wheelchair transfer</p> <p>for wheelchair transfer</p> <p>WC</p> | <p>basin in front of WC</p> <p>for wheelchair transfer</p> <p>WC</p> | <p>changing bed</p> |

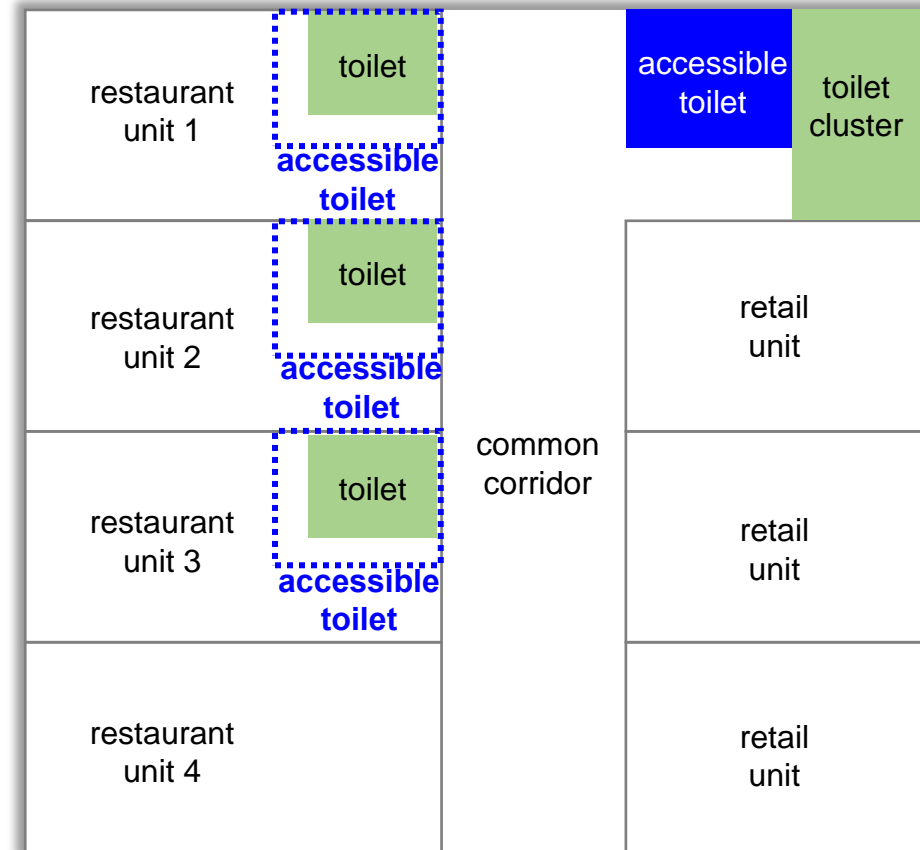
Accessible Washroom Provision

Clause 5.1.1

At **every level** of a non-residential building **where toilets are provided**, at least one accessible individual washroom must be provided as described in clause 5.2.



Scenario 1 (diagrammatic section)



Scenario 2 (diagrammatic plan)

- Accessible toilet must be provided **at every toilet cluster**

- Accessible toilet must be provided **where toilets are provided** in individual restaurant units

Hearing Enhancement Systems (HES) -----> Enables sound signals to be transmitted to a **hearing-impaired** person without interference of background noise or excessive reverberation.

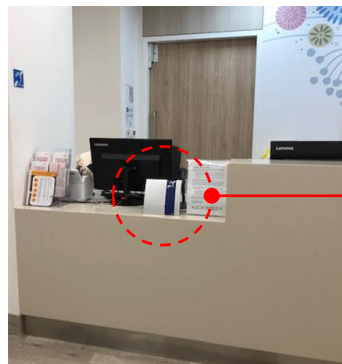
Required at:

a) Hall & auditorium:



➤ **Advisory:** On-site testing to comply with **IEC 60118-4** before TOP to avoid inconvenience for users and rectification works after handing over

b) Min 1 of the public information / service counter for cinema, theatre, concert hall, stadium, museum, purpose-built family amusement centre, etc



Hello! I can hear you!!



Hello, may I help you?

Sheltered Accessible Route

Where shelter is provided for walkways in a development, similar shelter should also be provided for accessible route (ramps, etc).

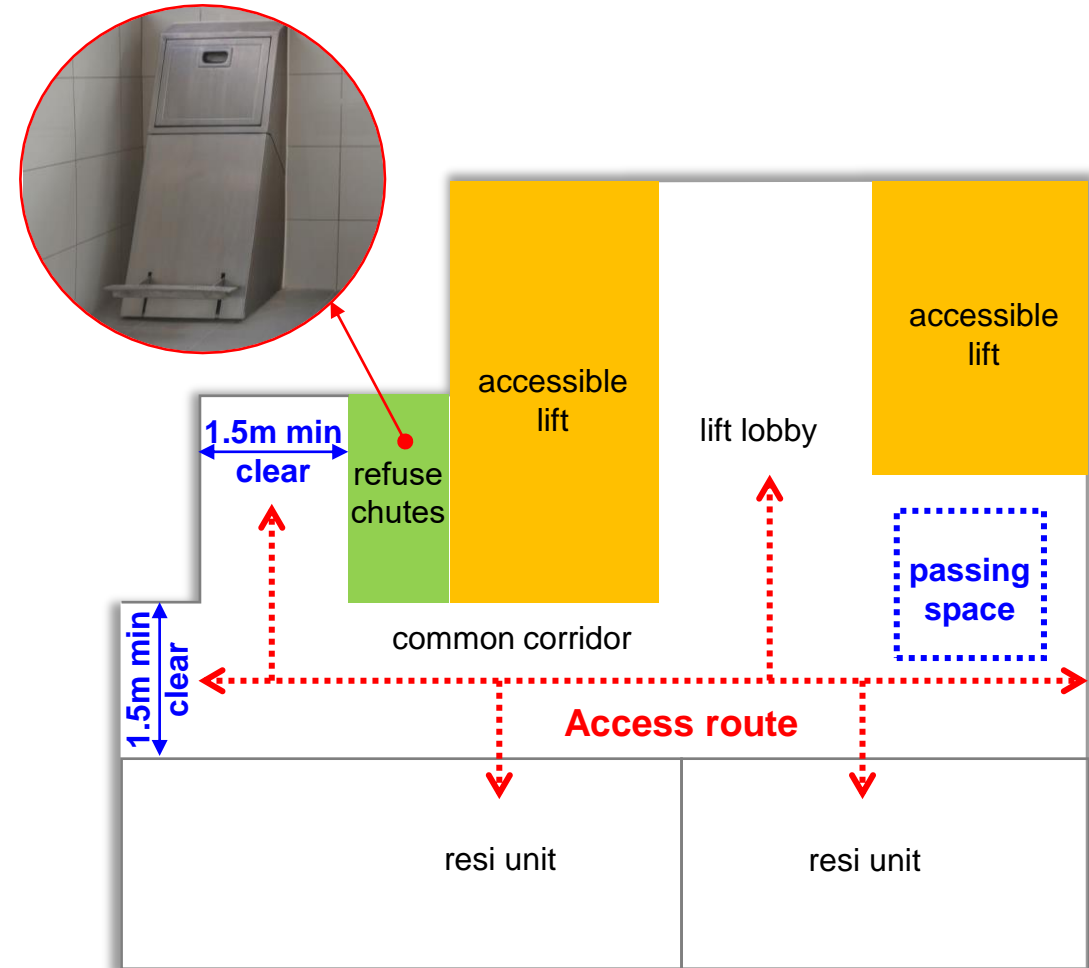


Access to Refuse Chute

Person with disability must be able to independently access and use common facilities like the Refuse Chute.



- **Door handles** in common area to comply with Clause 6.2.3.2 for hand-operated controls requirements



Residential Building (diagrammatic plan)

- The width of corridor leading to common facilities like refuse chute must be min. **1.5m clear**, without hopper's pedal encroaching into the accessible route

Part 2: UDi & AF

Universal Design Index (UDi)



UDi Recap

- An index to indicate the level of **user-friendliness** of buildings
- **Self-assessment** tool by developers and designers
- To be submitted with BP / TOP / direct CSC application

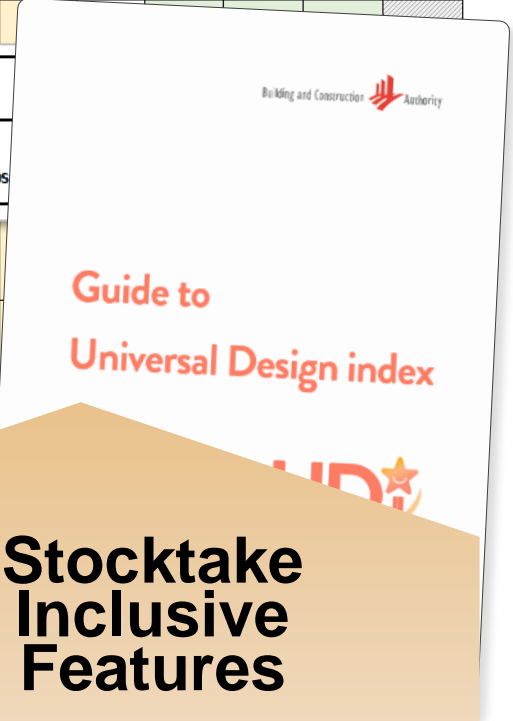


| | | Inputs | Max Points | Points Scored for Persons with Disabilities | Points Scored for Elderly | Points Scored for Families with Young Children | Points Scored for Expectant / Nursing Mothers |
|----------|--|--------|------------|---|---------------------------|--|---|
| J | SOCIAL & RECREATIONAL FACILITIES | | | 4 | 2 | 1 | 0 |
| J.1.1 | Community gardening with access for wheelchair users | N | 1 | 0 | 0 | | |
| J.1.2 | Gymnasium with equipment for wheelchair users | Y | 1 | 1 | | | |
| J.1.3 | Outdoor fitness stations with equipment for elderly | Y | 0.5 | | 0.5 | | |
| J.1.4 | 3G (Three Generation) concept in the placement of play and fitness areas | | | | | | |

Development's UDindex Rating

A

Excellent Universal Design Provisions
- Caters well to all identified user groups



Increase UD Awareness

- Encourage Designers and Developers to **consider** UD
- **Self-help / guide / reference** for Designers and Developers
- Check for **compliance with key requirements** in the Code on Accessibility



Grading Buildings

- Feedback on **level of friendliness**
- Provide **benchmark** for inclusive provisions
- **Shortlist top tier** friendly buildings for recognition

| | | | | | | | |
|----------|---|--|--|--|--|--|--|
| J.1.8 | and designated wheelchair seating spaces or braille and tactile row indicators | | | | | | |
| J.1.9 | Quiet room for persons with special needs or library collection for persons with disabilities | | | | | | |
| J.1.10 | Accessible drinking fountains | | | | | | |
| J.1.11 | Accessible letterboxes | | | | | | |
| | Accessible BBQ facilities | | | | | | |
| K | RESIDENTIAL UD | | | | | | |
| K.1 | | | | | | | |
| K.1.1 | | | | | | | |
| K.1.2 | | | | | | | |
| K.1.3 | | | | | | | |
| K.1.4 | | | | | | | |
| K.1.5 | | | | | | | |
| K.2 | | | | | | | |



Stocktake Inclusive Features

- **Information for public.** E.g. availability of accessible changing rooms



UDi Checklist Submission Requirement

| BUILDING WORKS REQUIRED FOR UDi SUBMISSION | DECLARED INFORMATION ⁽¹⁾ APPLIES TO |
|---|--|
| New building works with total GFA $\geq 500\text{m}^2$ | Entire Building |
| A&A works with <u>Total GFA</u> ⁽²⁾ $\geq 500\text{m}^2$, where:- | |
| A&A works $\geq 50\%$ of the total <u>existing GFA</u> ⁽³⁾ or total no. of storey of the existing building | Entire Building |
| A&A works $< 50\%$ of the total <u>existing GFA</u> ⁽³⁾ or total no. of storey of the existing building | A&A areas only |
| BUILDING WORKS NOT REQUIRED TO MAKE UDi SUBMISSION AND DECLARATION | |
| Building works with <u>Total GFA</u> ⁽²⁾ $< 500\text{ m}^2$ | |
| Landed residential developments, except those with communal facilities | |
| Non-buildings such as linkways, covered drop-offs, bus stops, pedestrian overhead bridges, underpasses, and the like | |

Notes:

(1) **Declared information** refers to accessible and universal design features declared in the UDi Excel Form.

(2) **Total GFA** refers to the overall GFA, encompassing both the existing building and A&A works

(3) **Existing GFA** refers to the GFA of the existing building excluding any addition

UDi Checklist

Universal Design index

INSTRUCTIONS

Inputs are required within yellow coloured cells only.

PROJECT INFORMATION

Please fill in ALL fields below in yellow coloured cells

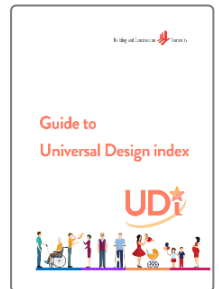
| | |
|--|--|
| Project Reference Number | A9876-21711-2022 |
| Description of Building Works | Proposed new 5 storey commercial building |
| Address of Building | 546 Somerset Road |
| Postal Code(s) (to separate with commas) | 589431 |
| Development Name, if any (to indicate "Nil" if there is none) | |
| Total GFA (m ²) | 5,843.80 |
| Compliance with version of Code | Code on Accessibility in the Built Environment 2013 |
| Declared information in this form applies to | Entire development (where there are multiple blocks) |
| Name of Developer Firm | Universal Development Pte Ltd |
| Name of Professional Firm | UD Architects |
| Name of Qualified Person | Ar. Tung U Dee |
| Development's UDindex Rating | - |
| | PLEASE CHECK YOUR INPUTS THROUGHOUT THE FORM |



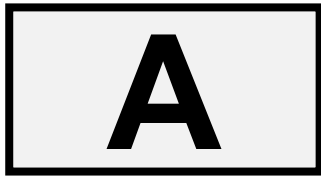
- 1** To fill in all cells in **yellow**
- Project particulars to tally with WP/BP documents
 - Select from drop-down list for “Compliance with version of Code” an “Declared information in this form applies to” (drop-down function will be shown properly in latest version of Excel)
 - “Professional Firm” refers to QP’s company name

- 2** To ensure **UDi Rating** is generated
- If UDi Rating not generated...
- To check all inputs throughout the form are in order
 - To check mandatory items to comply with Code on Accessibility

➤ More tips for filling up checklist can refer to [Page 7 in Guide to Universal Design Index](#)



Exemplary projects with UDi rating of "A" will be shortlisted and considered for the annual **Universal Design Excellence Award (UDEA)**



Excellent Universal Design provisions
Caters well to all user groups



Presentation of Awards to Winners of UDEA 2023



BIRD PARADISE & MANDAI WILDLIFE WEST



ONE PUNGGOL



CHANGI T2 EXPANSION



INTRODUCING THE NEW UDI INFORMATION PORTAL

For members of the public eager to explore!

Excited to explore a newly opened building?
Do a quick check to see if the building has user-friendly features which you may find helpful at our Universal Design index (UDi) information portal!



| User Group | Persons with Disability | Elderly | Families with Young Children | Nursing or Expectant Mothers |
|------------|-------------------------|---------|------------------------------|------------------------------|
| Badge | | | | |

| | | |
|--|---|------------------|
| TTSH INTEGRATED CARE HUB 1 Tan Tock Seng Link Developer: MOH Holdings Pte Ltd Architect: CIAP ARCHITECTS PTE. LTD. | A | |
| Waterfront I & II @ Northshore 413A Northshore Drive Developer: HDB Architect: HDB | A | |
| 3 Science Park Drive Developer: Science Park Property Trustee Pte Ltd Architect: Surbana Jurong Consultants Pte Ltd | A | |
| EW04 Tanah Merah MRT Station, East West Line 920 New Upper Changi Road, Singapore Developer: LTA Architect: WSP | B | |
| HOMETEAMNS BEDOK 900 Bedok North Road Developer: Home TeamNS Architect: Surbana Jurong Consultants Pte Ltd | B | |

Useful links for Universal Design index (UDi)



UDi Self Assessment Framework
<https://go.gov.sg/bcaudi-framework>



Guide to UDi 2022
<https://go.gov.sg/bcaudi-guide>



UDi FAQs
<https://go.gov.sg/bcaudi-faq>



UD Excellence Award Winners (2023)
<https://go.gov.sg/bcaudea2023>



UDi Checklist Submission Link
<https://go.gov.sg/udi-checklist-submission>



UDi Checklist Download Link (BP)
<https://go.gov.sg/udi-checklist-download-bp>



UDi Checklist Download Link (TOP)
<https://go.gov.sg/udi-checklist-download-top>



UDi Information Portal
<https://go.gov.sg/udi-portal>

Part 2: UDi & AF

Accessibility Fund (AF)



TOP PRACTICES AND REGULATORY UPDATES 2024

For Private Buildings built before the Implementation of Code on Barrier-Free Accessibility in Buildings



up to

80% co-funding for

Basic Accessibility Features

For Private Buildings built before the Implementation of Code on Accessibility in the Built Environment



up to

60% co-funding for

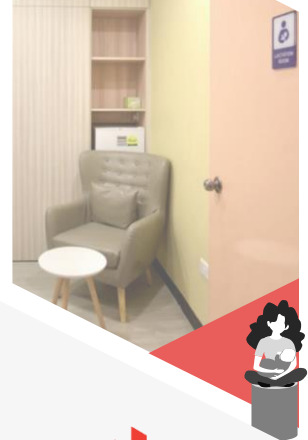
Universal Design (UD) Features



1990



2013



Building and Construction Authority

Accessibility Fund (AF)

Provides grant to owners of private buildings to improve the accessibility of their existing buildings. Available till end **March 2027**.

Who Can Apply?

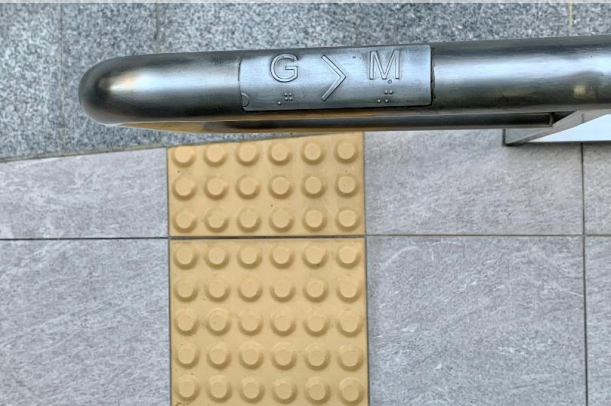
- Private building owners
- Lessors with ownership rights
- Lessees with owners/lessors' approval



160 Buildings

have tapped on the Accessibility Fund (AF)

Handrail with Braille & Tactile



Accessible Washroom



Accessible Washroom

AF Recipient

Panasonic Factory



Accessible ramp



Signages



The Octagon

AF Recipient



Lactation Room



Accessible Car Park Lot

Useful Links for Accessibility Fund (AF)



*Accessibility Fund &
Funding Eligibility*
<https://go.gov.sg/bcaud-af>



*Accessibility Fund
Enquiry Form*
<https://go.gov.sg/bcaud-af-enquiry>



*Accessibility Fund
FAQs*
<https://go.gov.sg/bcaud-af-faq>

Thank You



@BCASingapore



TOP/ CSC Inspection Common Findings and Smart Initiatives

BENJAMIN TAN

Senior Manager

BUILDING CERTIFICATION & OPS PLANNING DEPARTMENT
AUDIT & INSPECTION GROUP



CONTENT

- ❖ TOP/CSC Inspection Common Findings
- ❖ General Observations on Common Civil Defence (CD) Shelter Construction Non-compliances
- ❖ Common Inspection Non-compliances under Environmental Sustainability (ES) Code
- ❖ Smart Initiatives for TOP/CSC Inspections



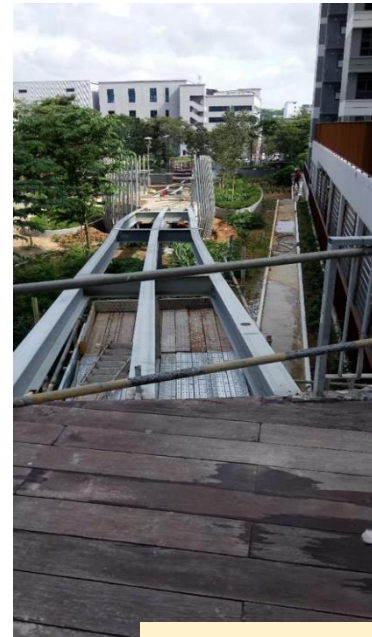
TOP/CSC INSPECTION COMMON FINDINGS



INCOMPLETE SITE CONDITIONS FOR INSPECTION

Reminder of circular issued on 17 Feb 2023

- **Example of incomplete works:**
 - No **safe and proper egress, ingress and access** within the development
 - Incomplete **structural/façade works, approved document and accessibility requirements**
- **Consequences of incomplete site:**
 - **False declaration** of incomplete works and **non-compliance with the regulatory requirements** is an **offence under Section 43A of the BC Act**.
 - BCA Officer will walk off, no WA will be issued.
 - Strong advisory will be issued to all project parties
 - **Express inspection and application may not be allowed** for re-inspection projects and project team's future projects may also be impacted for recurrent instances.



QP must ensure all **building works** are **completed** before **requesting** for a **TOP inspection**.

INCOMPLETE UNITS & COMMON AREAS

Completeness of units & common areas in move-in condition



To complete QM/CONQUAS assessments prior to TOP inspection



Disclaimer: Photos shown in this slide are for illustration purposes only

Water seepage

Wall openings

Incomplete units and common areas

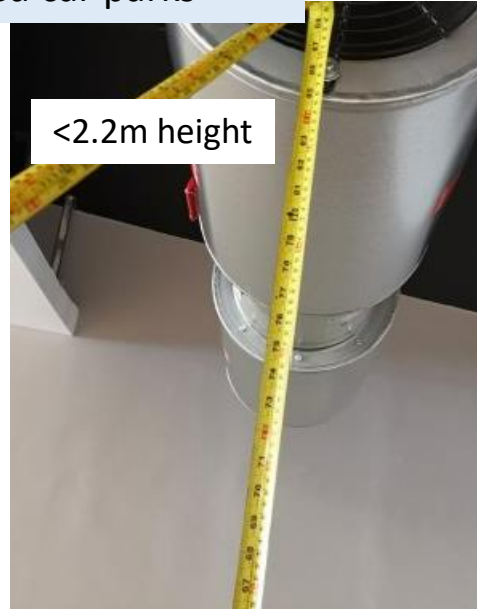
Incomplete works



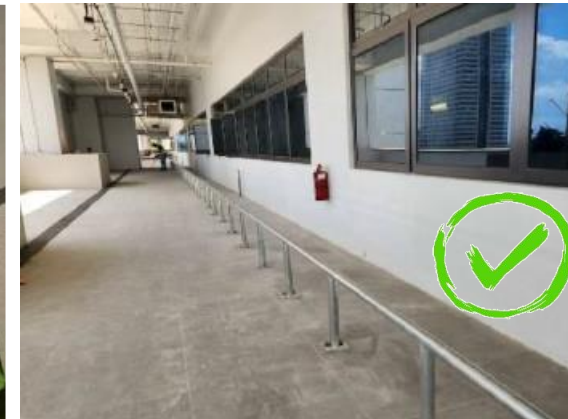
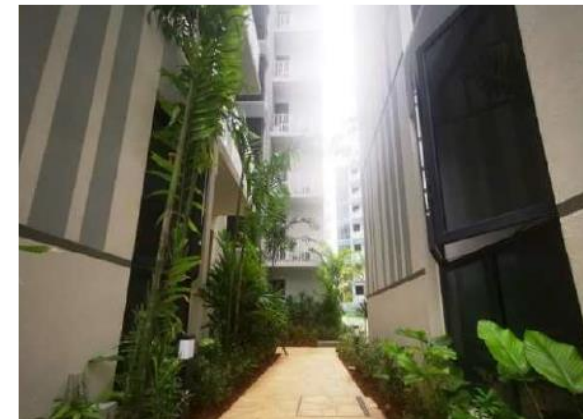
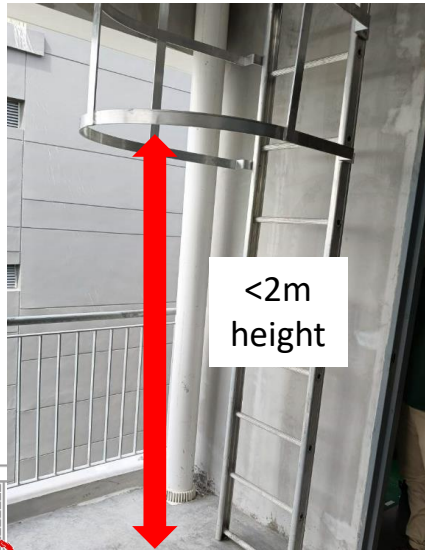
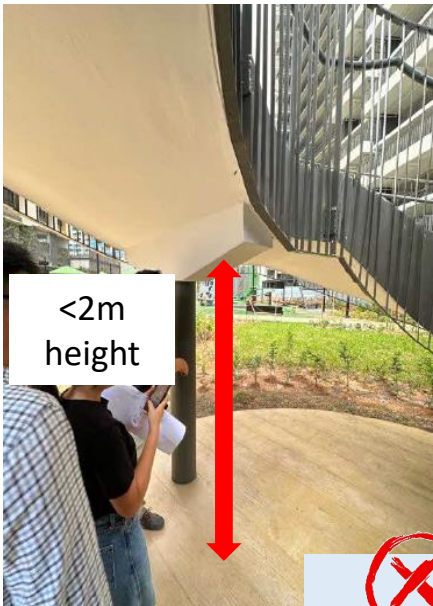
HEADROOM



Sheltered car parks



Addition of guard/barrier to prevent a person from walking near the space where headroom <2m.



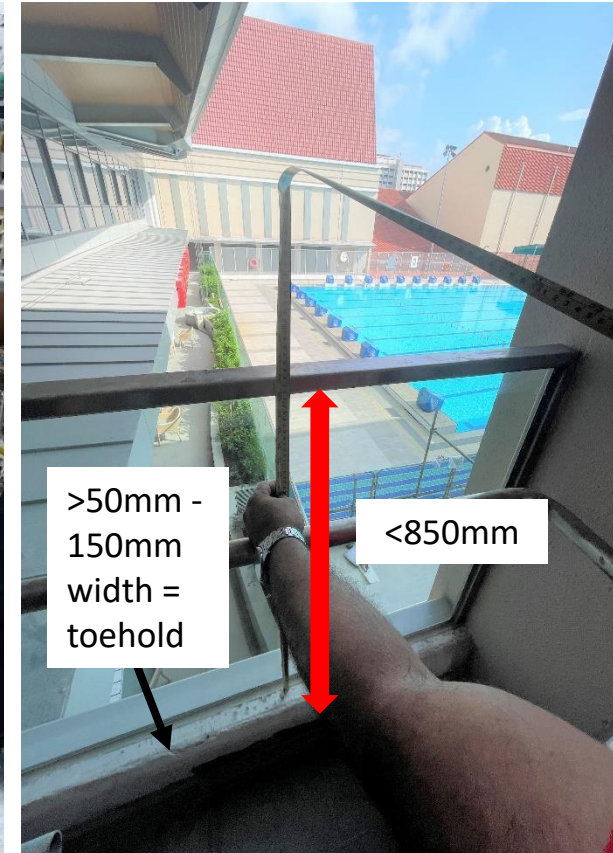
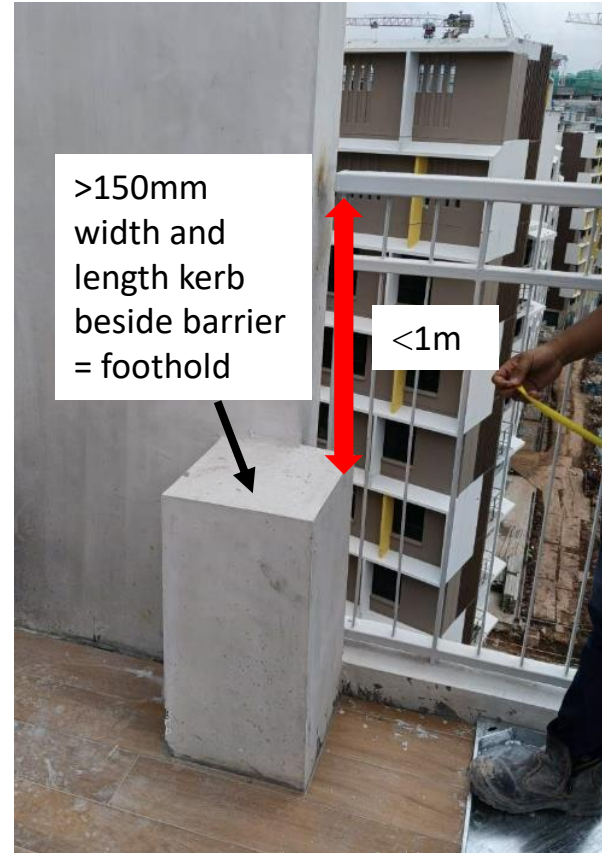
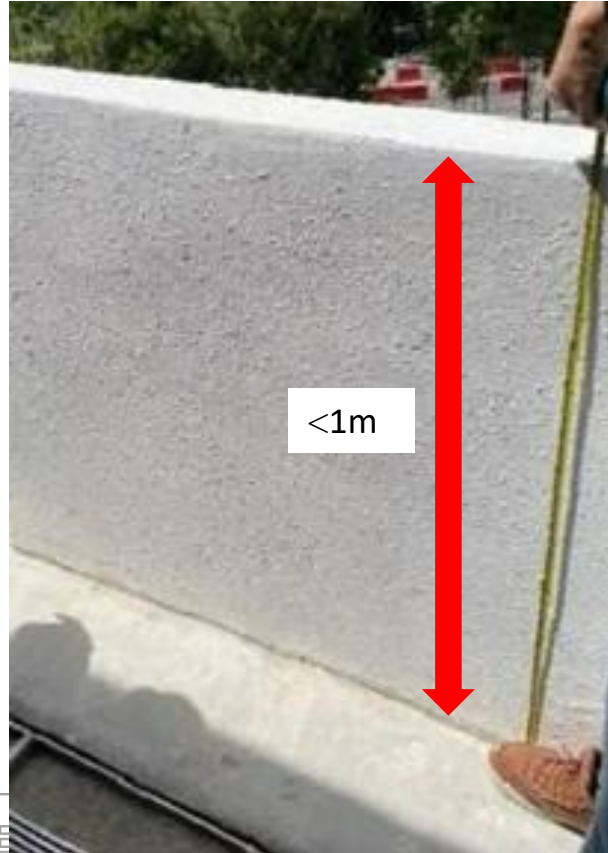
Circulation spaces





Protruding windows are acceptable in circulation areas with provision of guardrail/planter strips but **kept within the width of the guardrail and planter strip***


* the protrusion should not reduce the width of accessible route


SAFETY FROM FALLING



 No measure taken to prevent people from falling from height

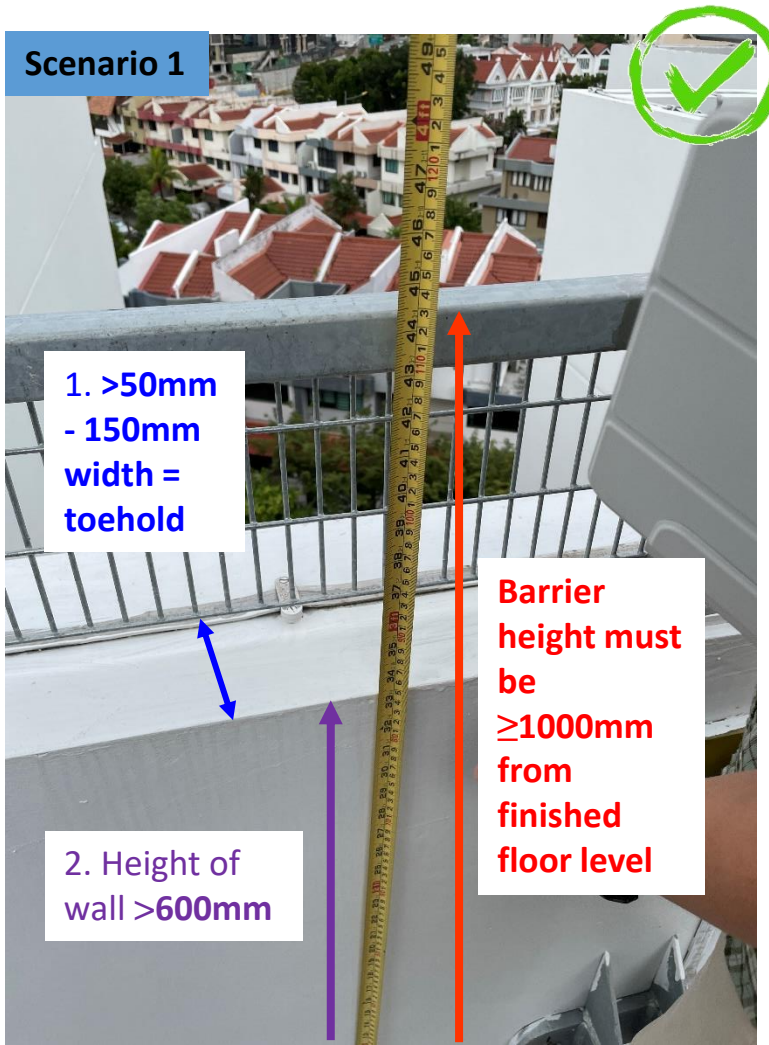
 Barrier height is less than 1.0m

 Barrier height is less than 1.0m when measured from top of foothold

 Barrier height is less than 850mm when measured from last climbable toehold



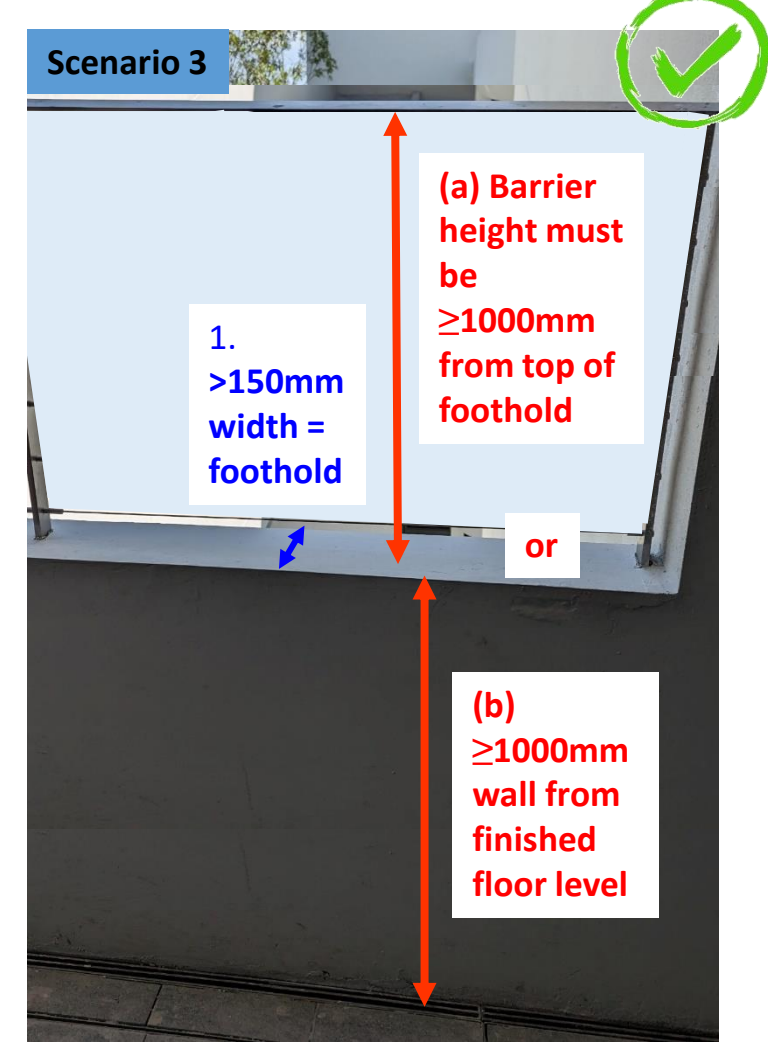
SAFETY FROM FALLING: Toehold vs Foothold for barriers



Non-climbable toehold

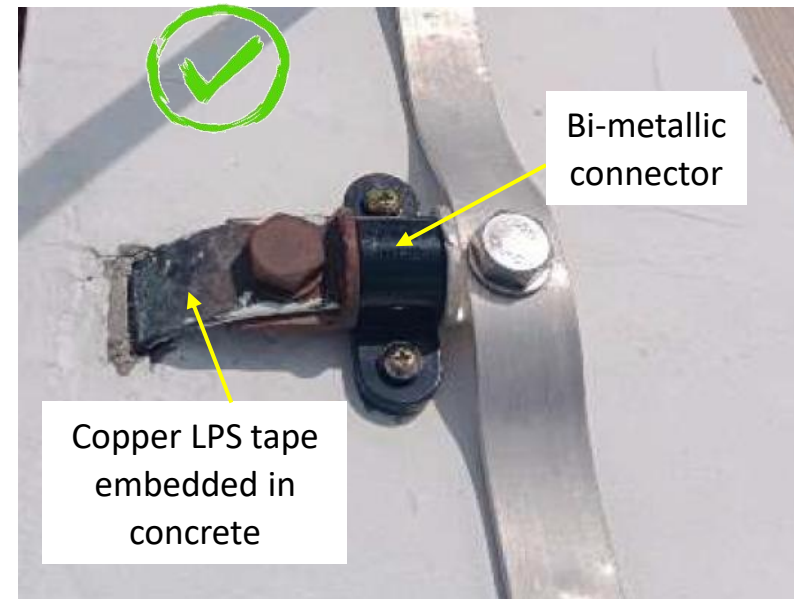
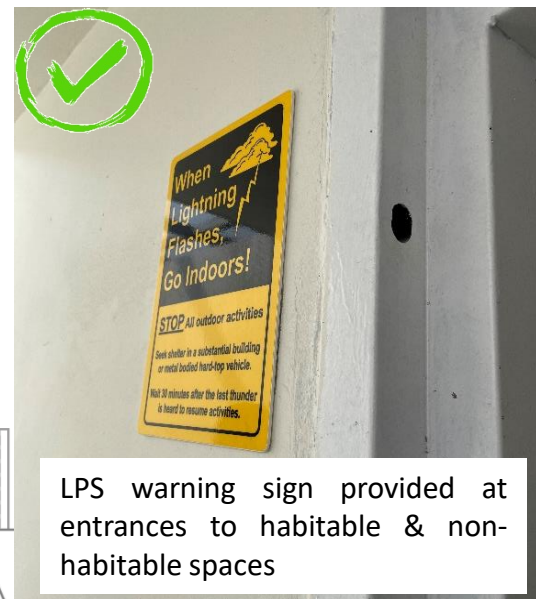
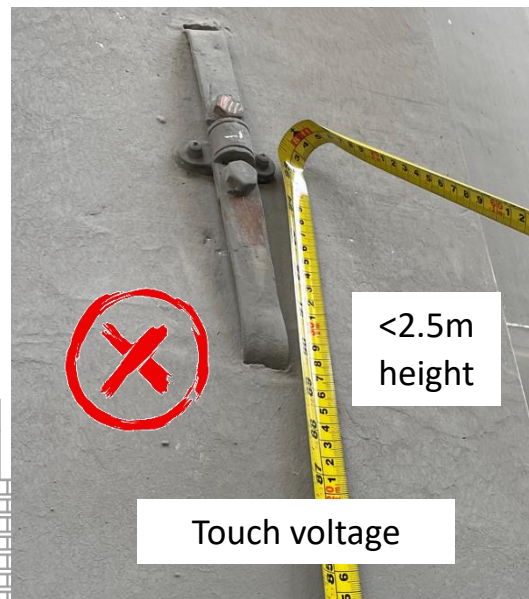
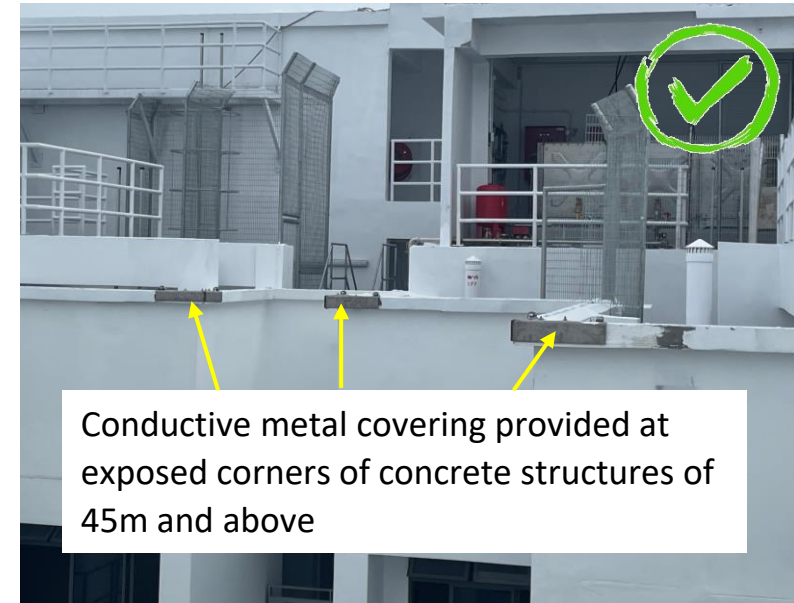
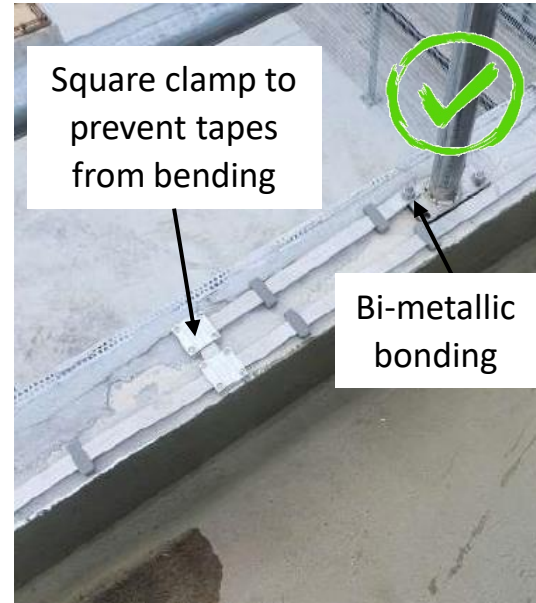


Climbable toehold



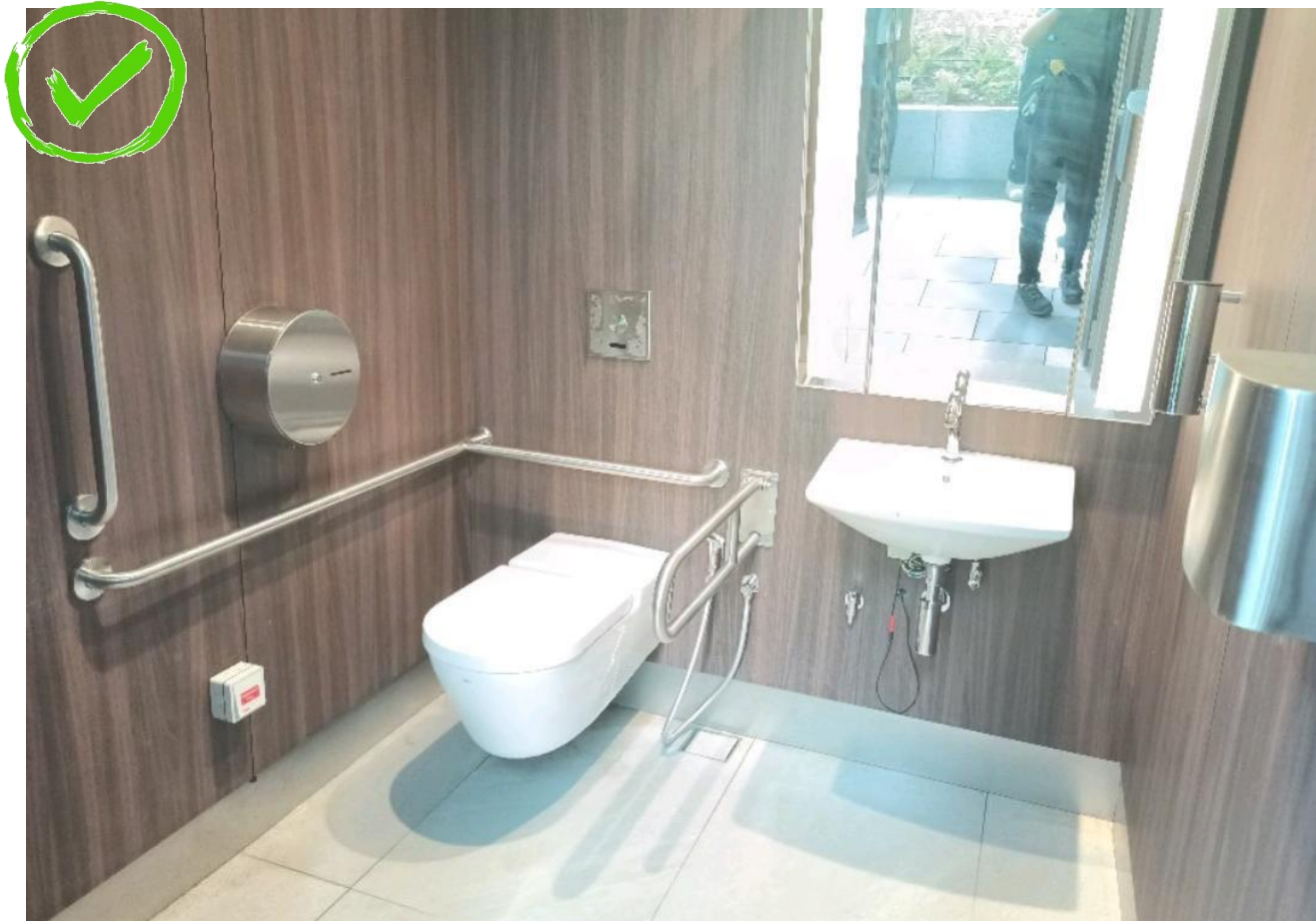
Foothold

LIGHTNING PROTECTION SYSTEM



ACCESSIBLE INDIVIDUAL WASHROOMS & ACCESSIBLE VEHICLE PARKING LOTS

ACCESSIBLE INDIVIDUAL WASHROOMS



Common findings for accessible washrooms:

- Missing items such as hooks, mirror, bidet spray, call bell, etc.
- Missing horizontal bar on door
- No min. 300mm space on push side for door due to basin obstruction



ACCESSIBLE VEHICLE PARKING LOTS



Vertical sign adjacent to lot with telephone number

Symbol of Access marked on lot with white stylized figure on blue background

Common findings for accessible carpark lots:

- Missing vertical sign with telephone number
- Symbol of Access does not comply



ALIGHTING/DROP OFF POINT



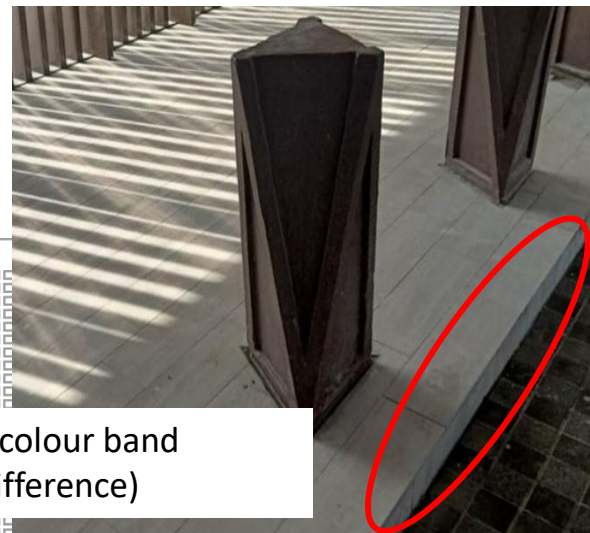
No tactile warning indicator (with no level difference)



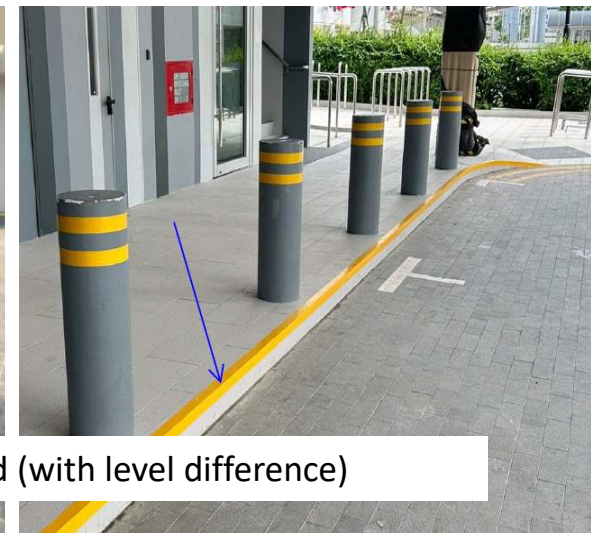
Tactile warning indicator with contrasting colour (no level difference)



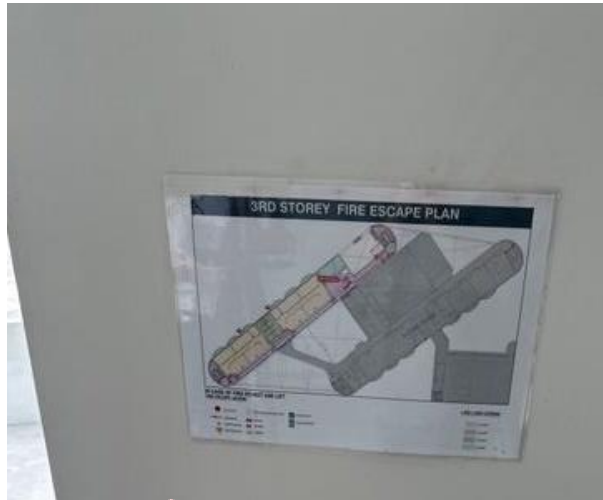
No contrasting colour band (with level difference)



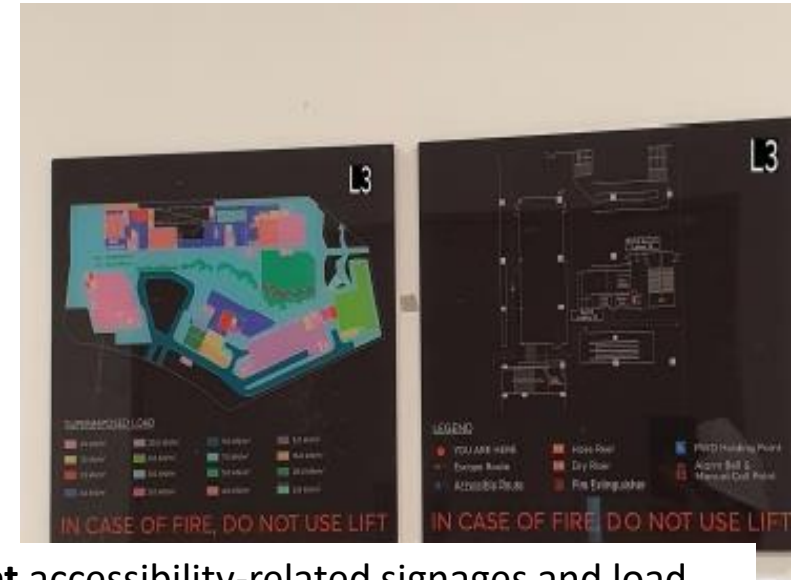
Contrasting colour band (with level difference)



ACCESSIBILITY-RELATED SIGNAGES & LOAD DIAGRAM



Missing/temporary accessibility-related signages and load diagram



Permanent accessibility-related signages and load diagram shall be installed before TOP inspection



REMINDERS

(1) ST FOR RISER FLOOR



Riser floor to resist loads –
ST submission is required



(2) DEVIATION FROM APPROVED PLAN



Deviation from approved building plan:

- QP must submit amendment plan and obtain **approval for material changes before commencing building works**
- **Amendment plans must be submitted and approved before TOP inspection**



Circular issued on
01/06/2021 on changes in
building works that deviate
from approved building plans

(3) OUTSTANDING TOP/CSC APPLICATIONS

- Reminder to **obtain TOP/CSC for the occupation** or use of buildings where the building works have been completed.
- **No/delayed response from QP** to BCA's written direction issued for TOP/CSC applications.
- **Illegal occupation** if building/building works is occupied **without TOP/CSC**.
- **Enforcement action** will be taken against relevant parties depending on investigation findings.

GENERAL OBSERVATIONS ON CD SHELTER CONSTRUCTION NON-COMPLIANCES

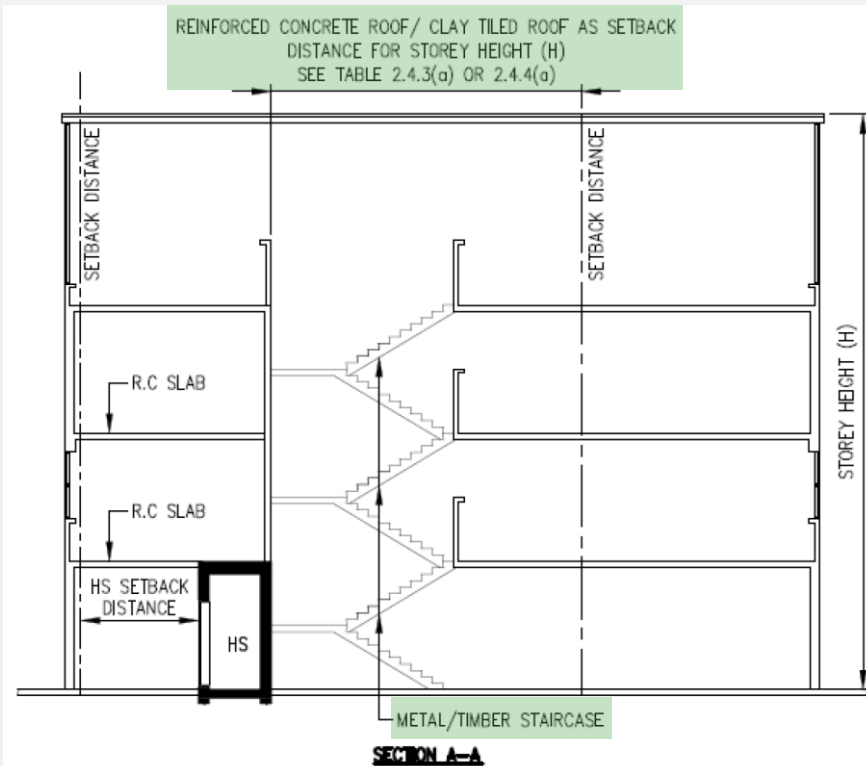


STAIRCASE WITHIN SETBACK DISTANCE

TRHS – Clause 2.4.1(c)

Where a staircase is located within setback distance of the HS wall, such staircase can be built of either rc or metal/steel or timber materials provided that it is covered with either rc roof or clay tile roof.

TRHS – Figure 2.4.1c(i)



Example of non-compliance

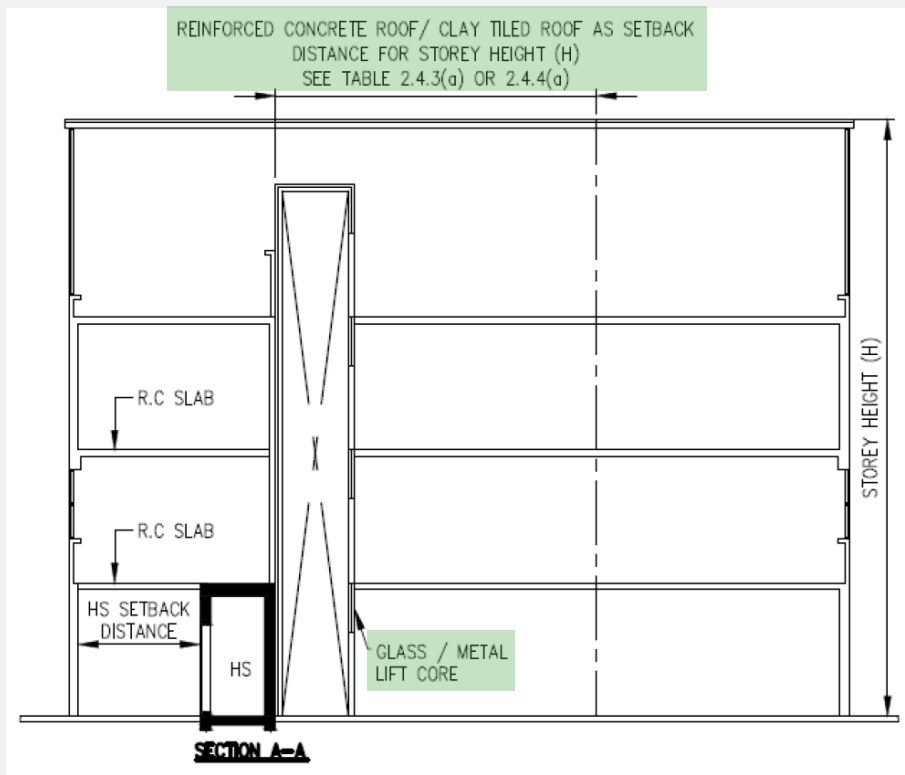


STAIRCASE WITHIN SETBACK DISTANCE

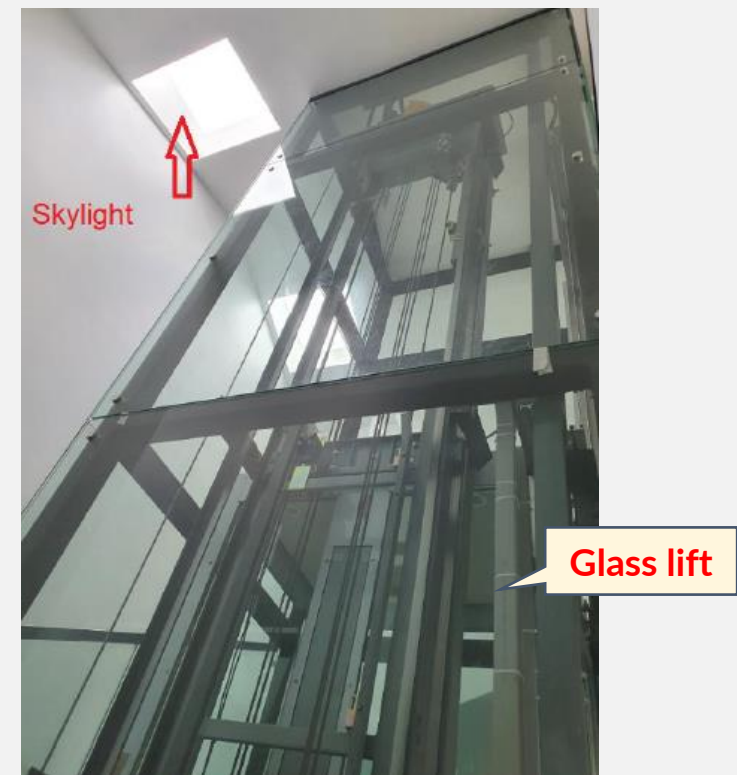
TRHS – Clause 2.4.1(e)

Where a non-reinforced concrete lift core is located within setback distance of the HS wall, such lift core shall be covered with either rc roof or clay tile roof and meet the setback distance.

TRHS – Figure 2.4.1e(i)



Example of non-compliance

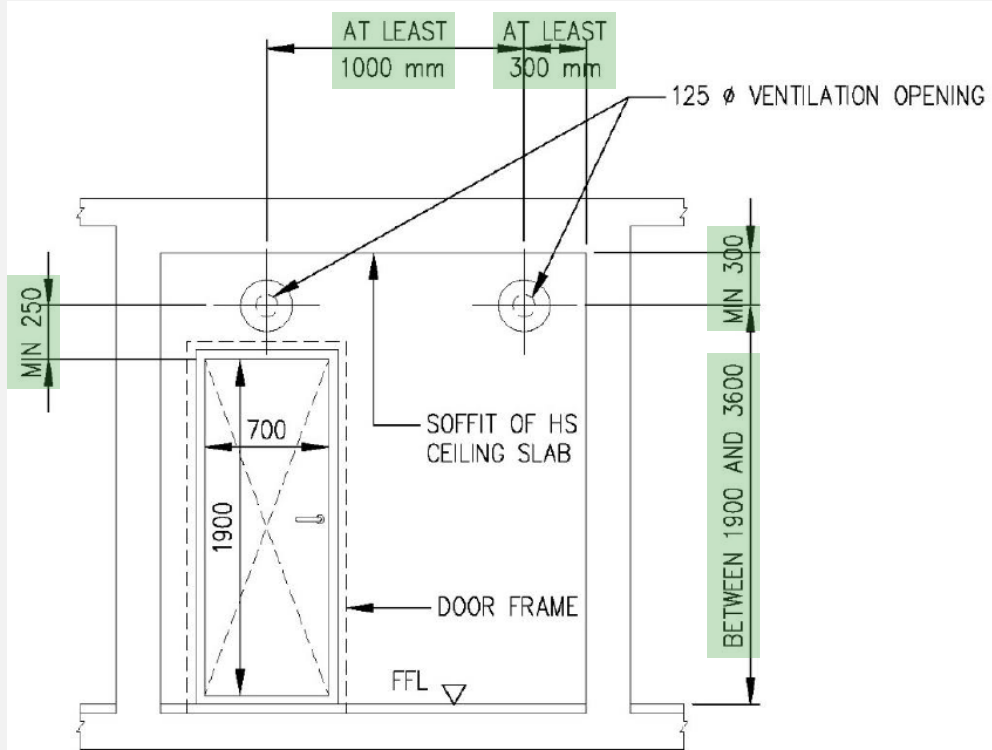


CLEARANCE OF VENTILATION SLEEVE

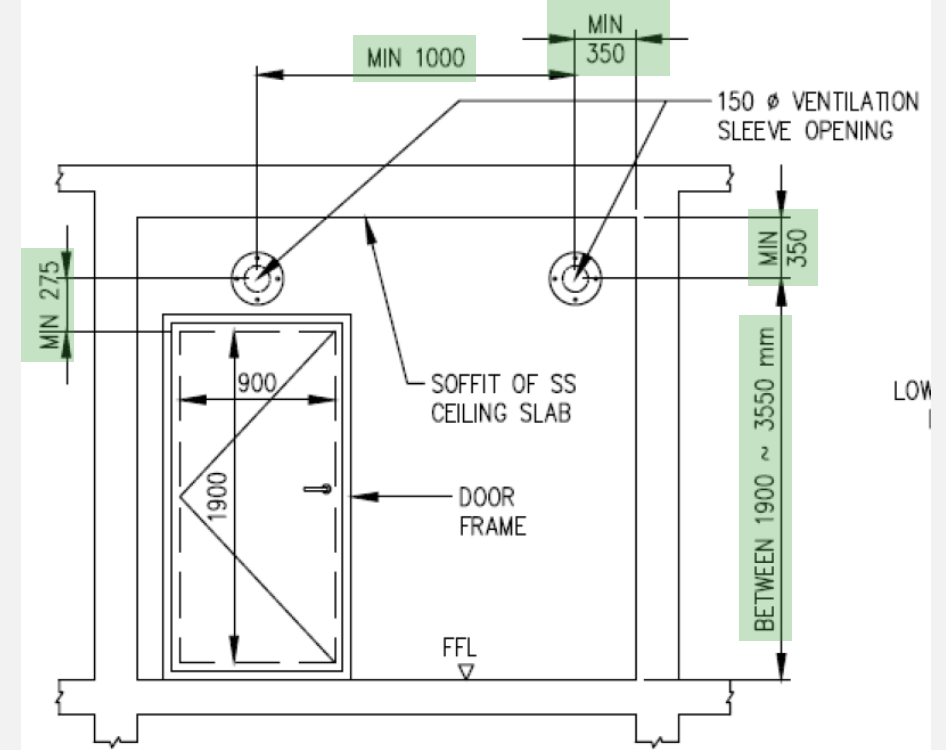
TRHS/TRSS - Clause 4.2

The position of each ventilation sleeve shall comply with the FIGURE 4.2(b).

TRHS – Figure 4.2(b) : Household shelter



TRSS – Figure 4.2(b) : Storey shelter



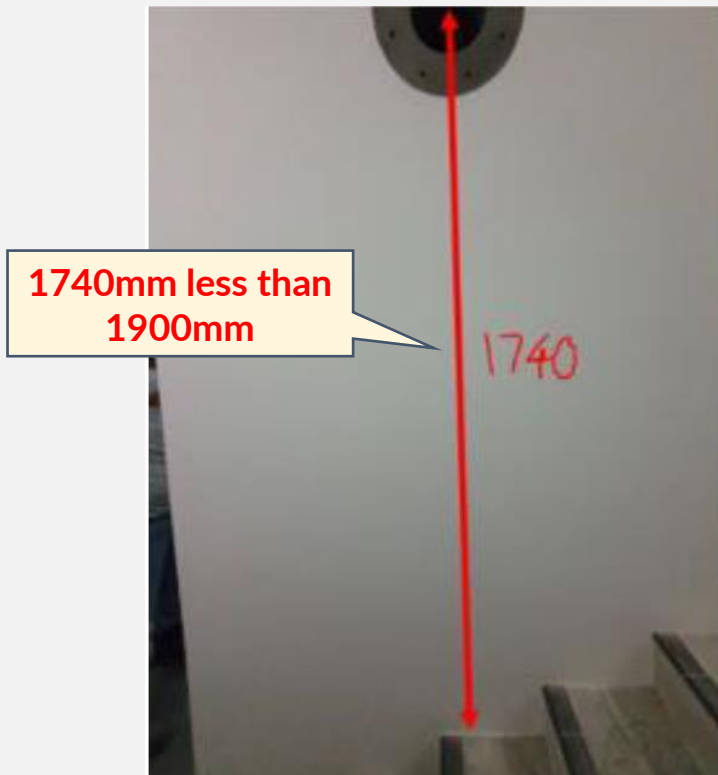
LOW

CLEARANCE OF VENTILATION SLEEVE

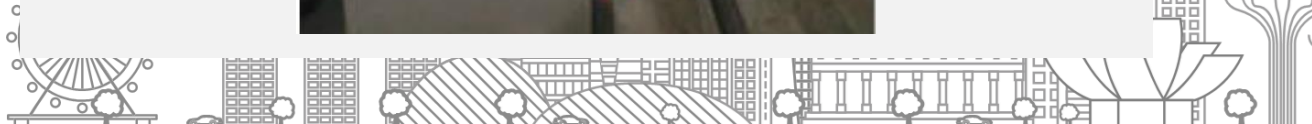
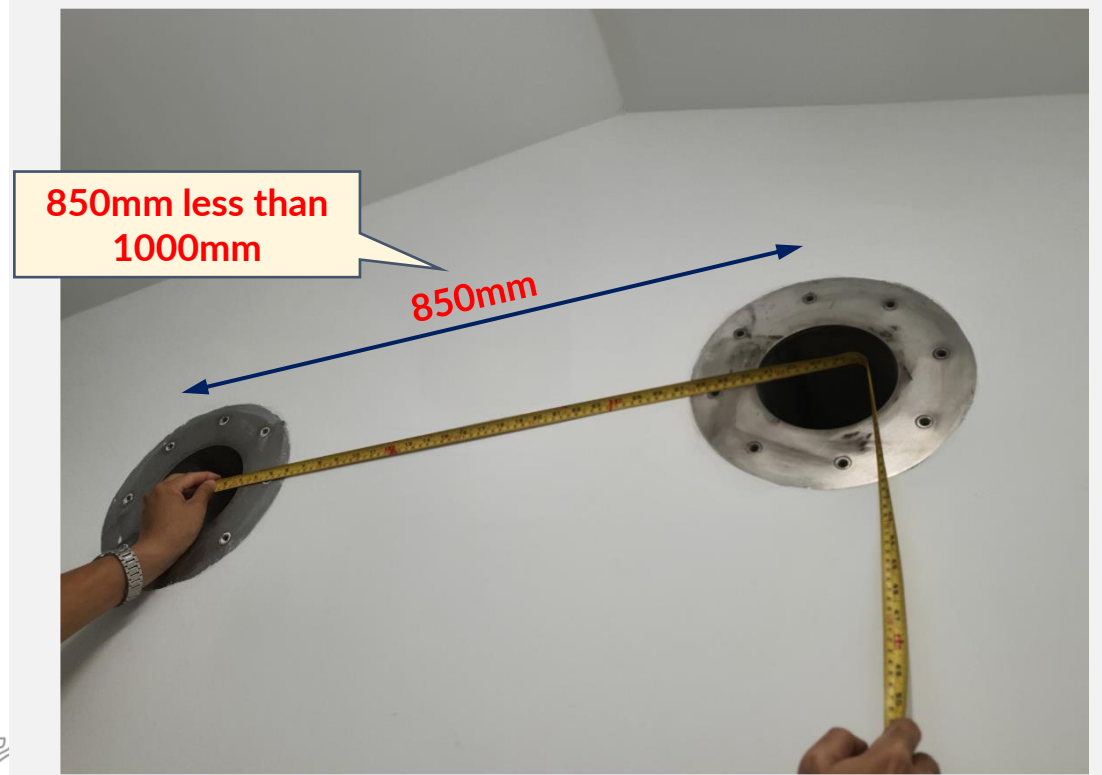
TRHS/TRSS - Clause 4.2

The position of each ventilation sleeve shall comply with the FIGURE 4.2(b).

Example of non-compliance



Example of non-compliance

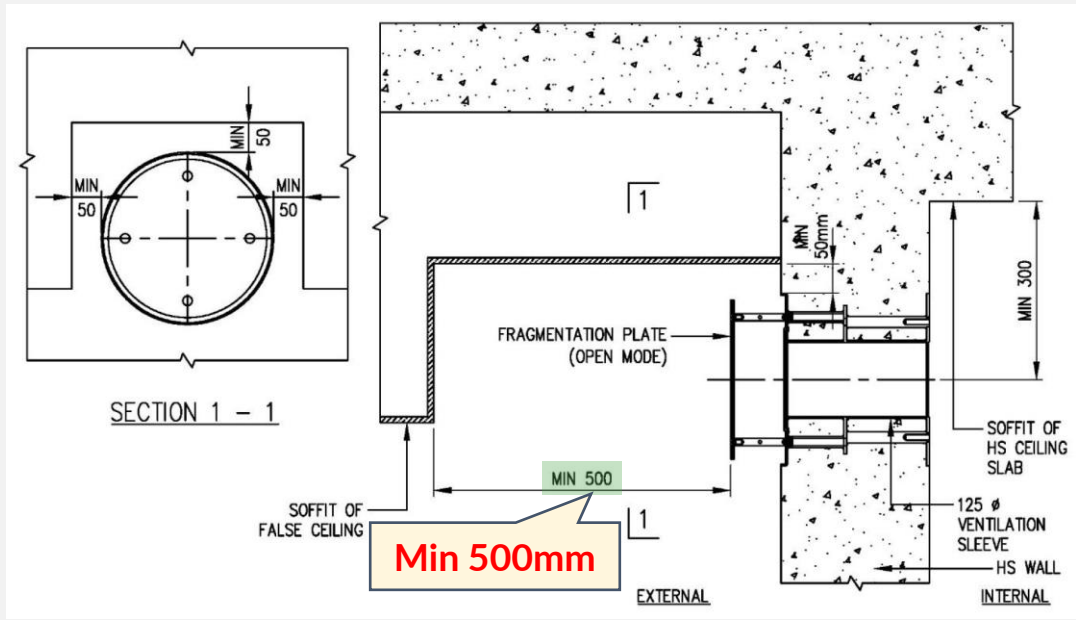


CLEARANCE OF VENTILATION SLEEVE

TRHS – Clause 4.3.1

Where the RC beam or structure or service is fronting the fragmentation plate of ventilation sleeve, the clear distance between them shall be at least 500mm.

TRHS – Figure 4.3.1



Example of non-compliance

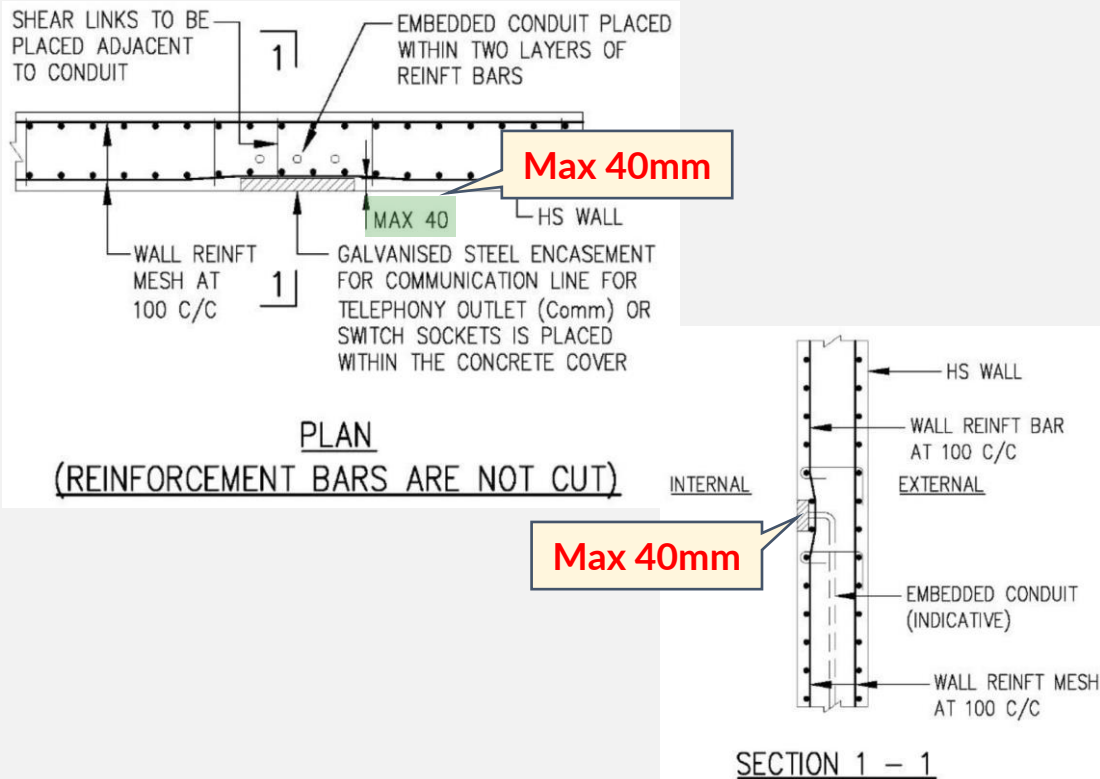


SERVICE SOCKET EMBEDMENT

TRHS – Clause 3.5.4

HS elements shall comply with the dimensions and detailed requirements as shown in the FIGURE 3.5.4(g) – Typical details of embedded conduit in HS wall.

TRHS – Figure 3.5.4(g)



Example of non-compliance

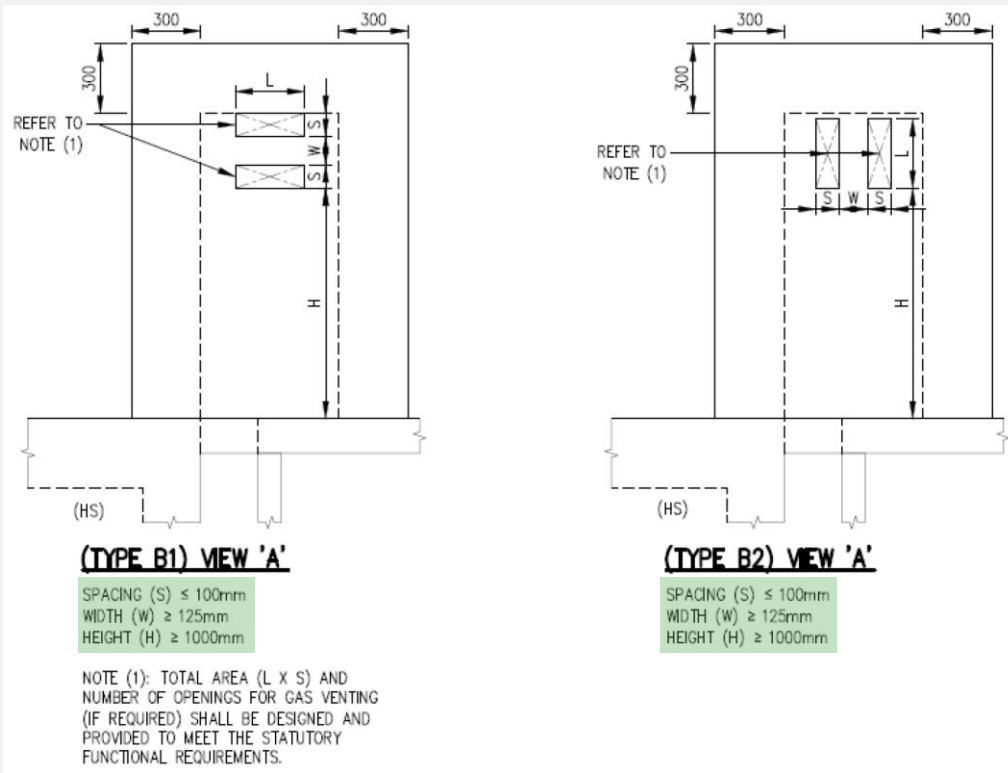


SERVICE RISER WITHIN SETBACK DISTANCE

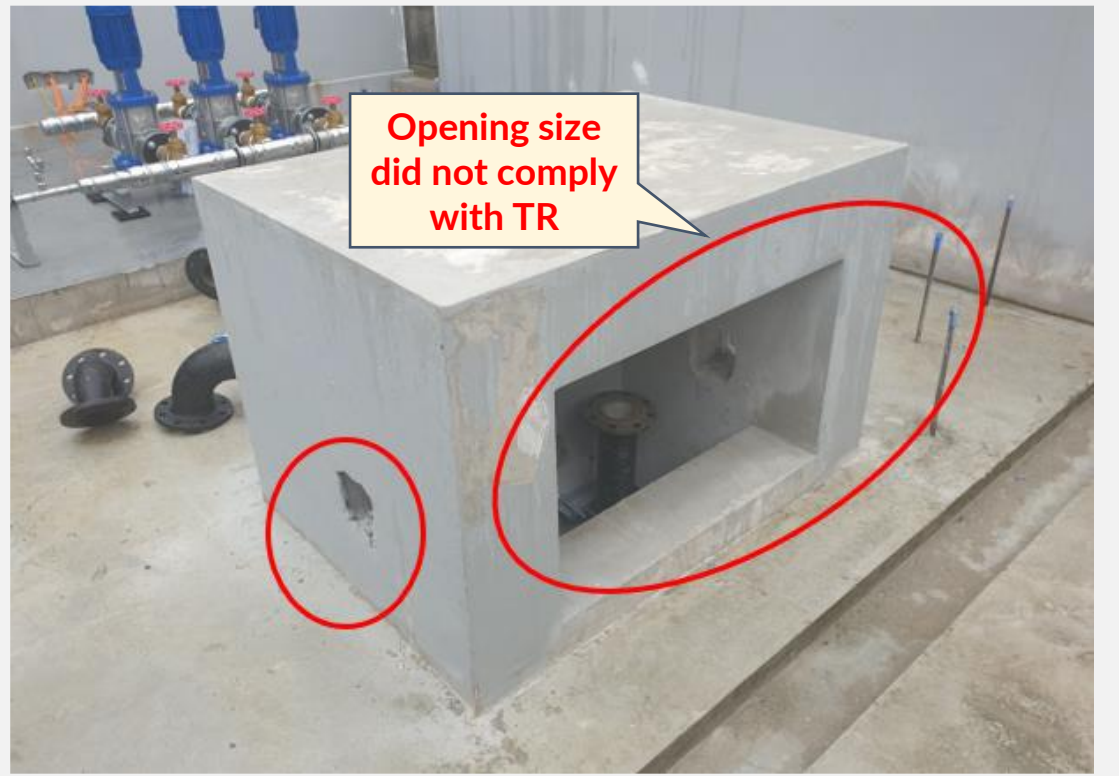
TRHS – Clause 2.4.7(c)

Where the service riser is abutting the HS or located within the setback distances and it protrudes above the main roof, it shall comply with the requirements shown in FIGURE 2.4.7c(ii).

TRHS – Figure 2.4.7c(ii)



Example of non-compliance

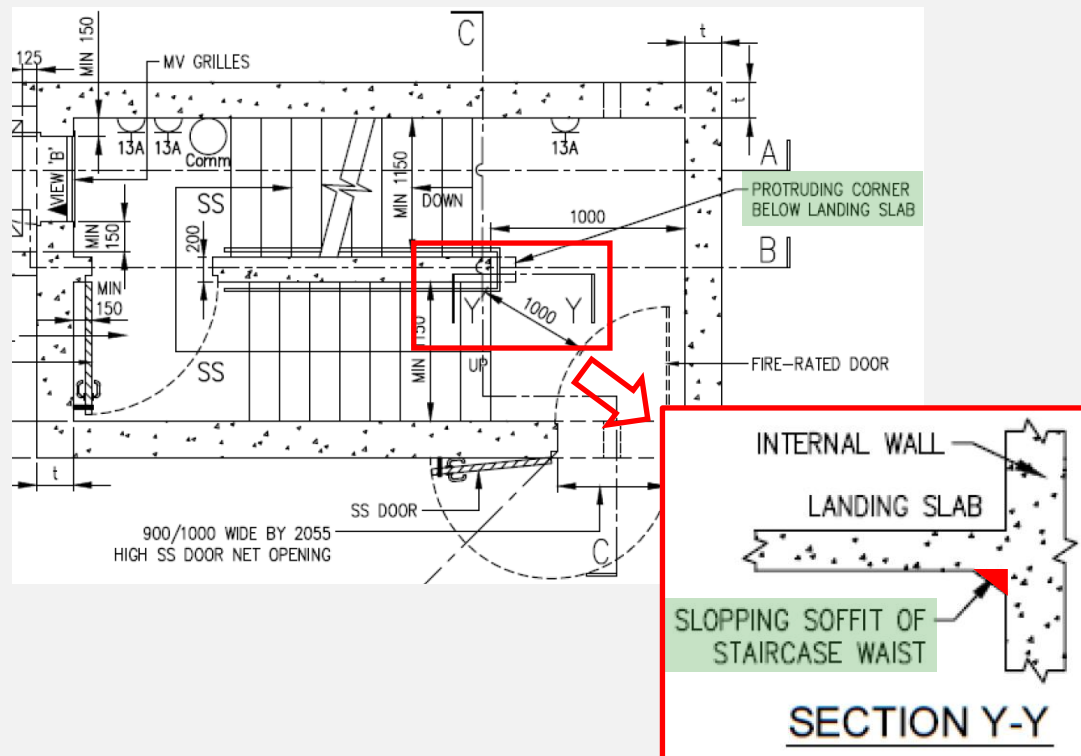


SLOPPING SOFFIT OF STAIRCASE

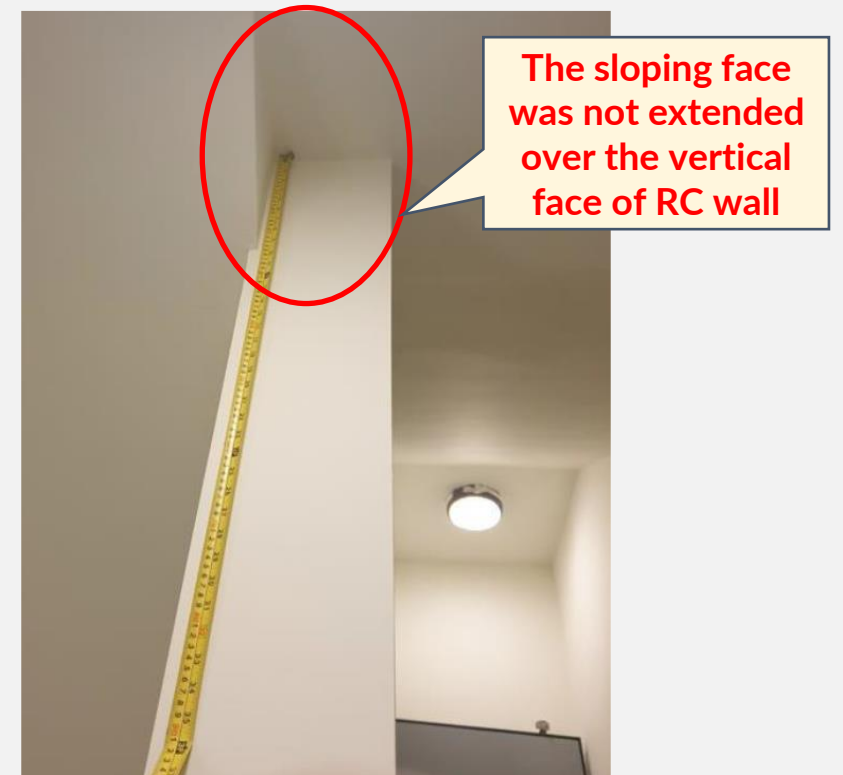
TRSS – Clause 2.12.4(c)

The slopping soffit of the staircase waist shall be continuous to meet the staircase. This shall include the part of slopping soffit projected from the 200mm thick internal wall as shown in FIGURE 2.12.1(f).

TRSS – Figure 2.12.1(f)



Example of non-compliance



COMMON INSPECTION NON-COMPLIANCES UNDER ENVIRONMENTAL SUSTAINABILITY (ES) CODE



If your project is under:

New non-residential building works with GFA \geq 5000m²

- a) Government Land Sales (GLS)
- b) BE Transformation GFA Incentive Scheme
- c) GreenGov.sg (e.g. new Public Sector projects)

Please remember to consider Design For Maintainability (DfM) upstream...

Building Control (Environmental Sustainability) Regulations
2008 – Code for ES of Buildings, 4th Edition



... through providing access to Cooling System, i.e.:

- Chillers
- Chilled & Condenser Water Pumps
- Cooling Towers
- Air Handling Units

Green Mark (GM) 2021 – Maintainability Section

Mt

... through attaining Maintainability (Mt) Badge, i.e.:

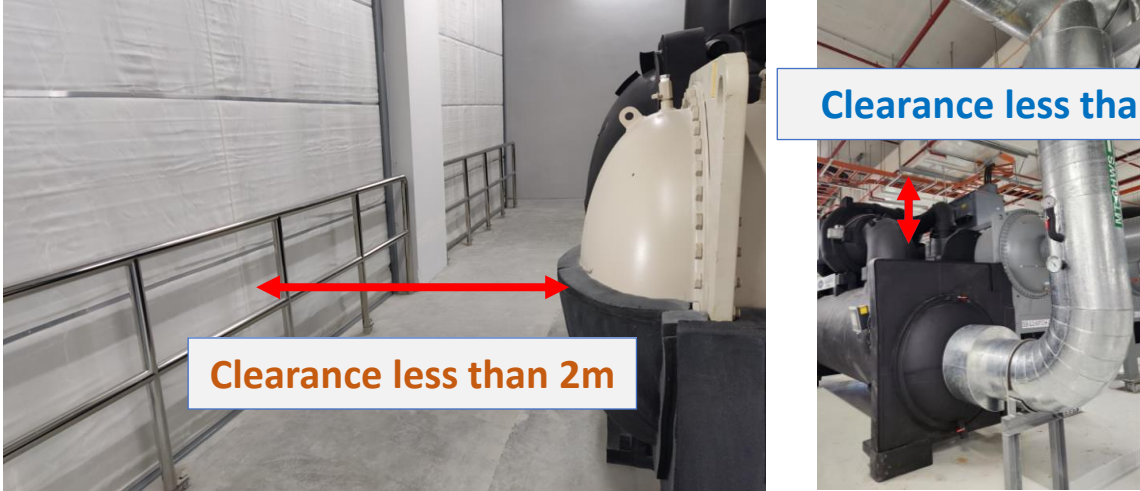

- Comply with prerequisites (e.g. drawings on façade access)
- Score \geq 10 GM points

GLS project also to attain GM clearances:

- GM Letter of Award for design
- GM Letter of Clearance for Stage 1 verification before TOP



... to facilitate timely issuance of your TOP downstream.

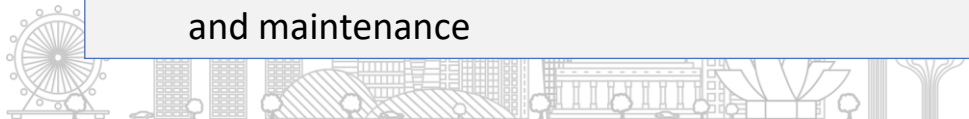
Common Non-compliances to Code for Environmental Sustainability of Buildings 4th Edition

| Requirements | Photographs of non-compliance |
|---|--|
| <p>Chiller access space provisions:</p> <ul style="list-style-type: none"> a) Clearance of 2m or more at the front of chiller unit piping section for tube maintenance and cleaning, repair and replacement of bigger components b) Clearance of 1.2m or more between the chillers measured from plinth to plinth for regular maintenance c) Clearance of 1.5m or more above the chiller for maintenance, overhaul or replacement |  |
| <p>Pump access space provisions:</p> <ul style="list-style-type: none"> a) Except for the areas where the pipes are connected, clearance of 0.6m or more is to be provided around the pump for regular maintenance b) Clear headroom of 1.0m or more above the pump and motor to facilitate maintenance, overhaul or replacement |  |



Common Non-compliances to Code for Environmental Sustainability of Buildings 4th Edition

| Requirements | Photographs of non-compliance |
|---|---|
| <p>Cooling Tower access space provisions:</p> <ul style="list-style-type: none"> a) Provision of maintenance platform, stairs and catwalks of 600mm width or more with handrails around the cooling towers and access to the level for periodic maintenance and the inspection of water basin and fill media b) Clear distance of 2.0m or more from the top of cooling towers to the location of the trellis where applicable |  <p>No maintenance platform</p> |
| <p>Air Handling Unit (AHU) access space provisions:</p> <ul style="list-style-type: none"> a) AHUs of cooling capacity greater than 35kW shall be floor mounted as stipulated in SS 553 b) The following access space provisions for floor mounted AHUs: <ul style="list-style-type: none"> i. AHU access - Provide minimum 1m clearance from AHU room door entrance to AHU for general maintenance ii. Cooling coil pipe and filter access - Provide 0.8m clearance after pipe connection iii. Fan access - Provide 0.8m clearance for fan/motor access and maintenance iv. AHU side and back clearance – Provide 0.6m clear width for general access and maintenance |  <p>Less than 0.6m</p> |



Please refer to the advisory dated 22 Mar 2024 for more details:



https://corenet.gov.sg/media/2391958/circular_es-code-gm_22mar2024.pdf

Building and Construction Authority

An MND Statutory Board

Date: 22 Mar 2024

To: See Distribution List

Dear Sir/Madam,

ADVISORY ON DESIGN FOR MAINTAINABILITY SUBMISSIONS

Who should know

Developers, Building Owners, Architects, Engineers, Facilities Management (FM) Companies, Managing Agents (MA), Environmental Sustainability Design (ESD) Consultants, Builders, Mechanical & Electrical (M&E) Contractors, and Air-Conditioning Equipment Suppliers.

Objective

This circular reminds the industry on the requirements regarding Design for Maintainability (DfM) submissions for Green Mark 2021 (GM: 2021) – Maintainability (Mt) Section and the Code for Environmental Sustainability (ES) of Buildings, 4th Ed¹.



SMART INSPECTION INITIATIVES



Virtual Inspection for TOP

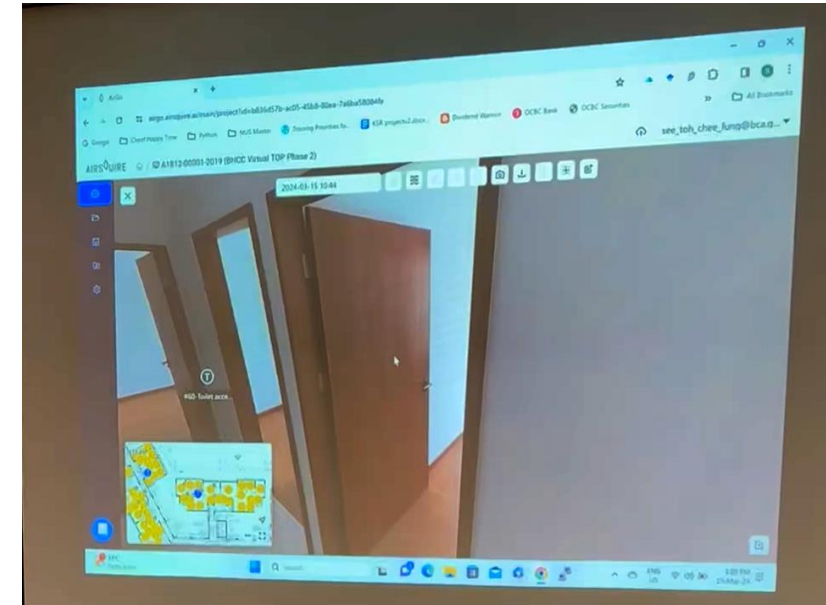
What if we can move away from this ...



Inspections are usually manpower intensive involving many parties



To this

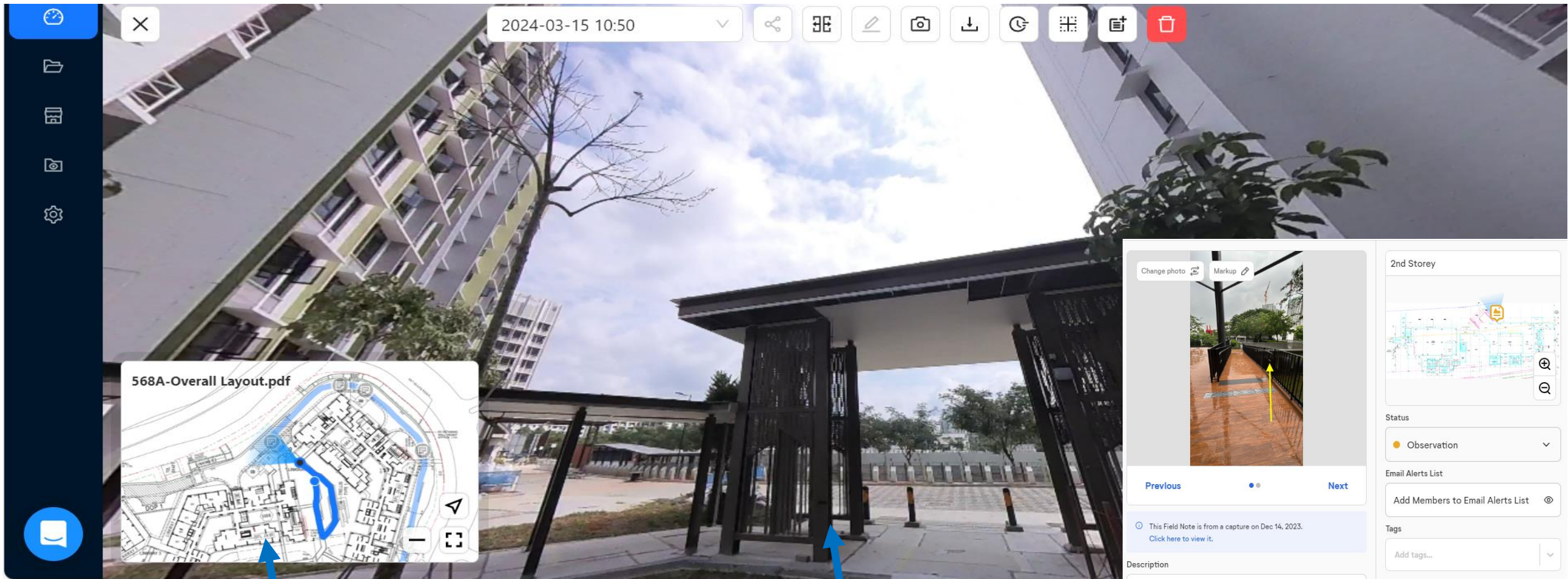


- Project Team can capture 360 scan and compliance photos
- The Capture can be reviewed anytime, anywhere without the need to go down to the site

Note

- The areas sampled and items checks are what already being done in physical inspections .
- There is no difference for a virtual or a physical inspection.

360 Capture for Virtual TOP



360 capture platform ties the virtual twin of the building with the building plan

Virtual inspection could easily be conducted anytime instead of a pre-arranged timing

Agencies comments could be easily tagged on the 360 capture

360 Capture for Virtual TOP

Typical levels

- A minimum of 3 typical floors (~1 for every 10 floors) are to be selected in each building for the virtual inspection.

Non-typical levels

- Roof with maintenance access in the building,

Non-typical levels

- To include all other non-typical floors whenever applicable

Non-typical levels

- External surrounding around the building

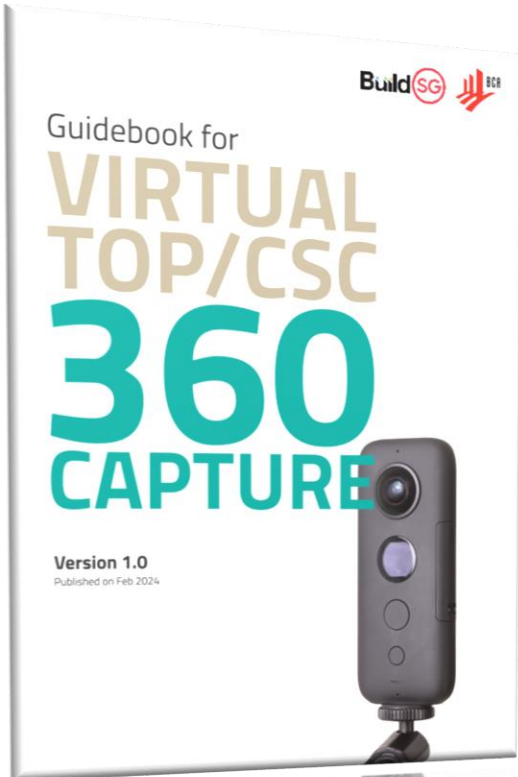


As each project may differ, project teams can approach BCA to discuss on the exact areas and extend of scans required for their projects.

Virtual Inspection Guidebook

The first **Guidebook for Virtual TOP/CSC**

The Guidebook is divided in 4 sections to help guide on the different processes in a virtual inspection for TOP/CSC to help answer the key questions that the industry have.



Download 360 Guidebook from
<https://go.gov.sg/smart-inspection-tech-seminar>



Part A :
ASSESSING PROJECT SUITABILITY FOR VIRTUAL INSPECTION



Part B :
PREPARING FOR 360 CAPTURE



Part C :
CONDUCTING THE VIRTUAL CAPTURE



Part D :
SUBMISSION AND REVIEWING OF THE 360 CAPTURE FOR VIRTUAL INSPECTION

- Listing the requirements industry need to adopt a virtual TOP inspection
- Sharing on the **best practices in using 360 Captures** for BCA TOP inspections



Thank You



@BCASingapore



Good Building Design Practices for Lifts and Escalators

*Sharing on findings from Testing and
Commissioning and Design Plans trials and
waiver/alternative solutions applications*

Er. Jake Ang

Senior Engineer

INVESTIGATION AND ENFORCEMENT DEPARTMENT
ELECTRICAL AND MECHANICAL ENGINEERING GROUP



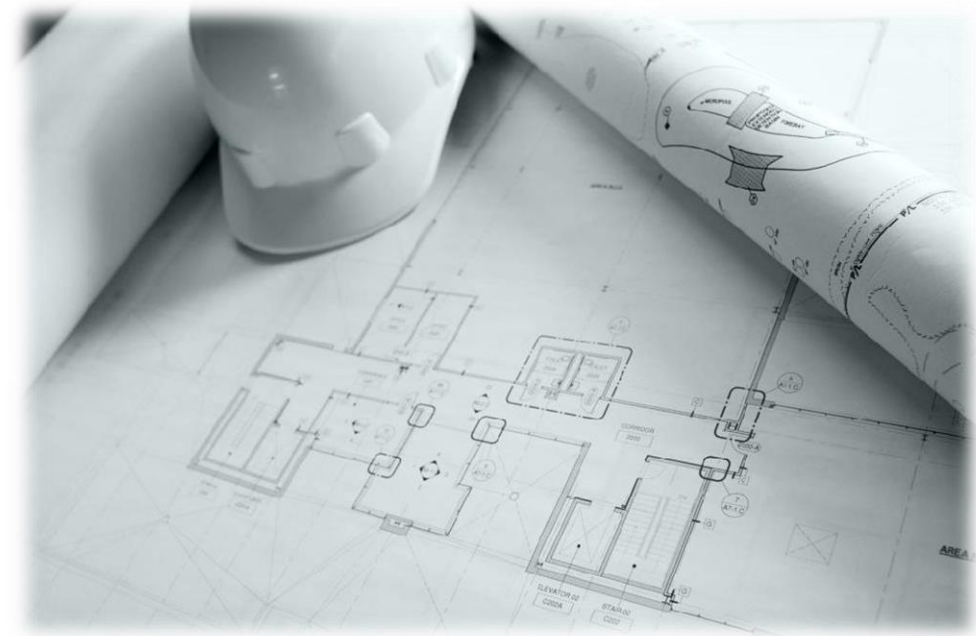
Agenda

- Update industry on **potential common non-compliances causing delays to TOP** relating to Lift and Escalator Requirements
 - Observations from Design Plan Submission Trial
 - Findings from Testing and Commissioning Requirements Trial
 - Recommendations for Waiver/Alternative Solution applications
- Update industry on preliminary study on **minimizing noise** from lift operations in residential development



Observations from Trials on Fixed Installation Design Submission (2D Plans and BIM)

Overview and Observations from Trial



Overview

Trial to gauge firms' internal readiness for Design Approval

Started early 2023

- **Fixed Installation (“FI”) design plan** submission regime target to start end-2024
 - Must obtain **Design Approval** before installation works can commence
- Firms (building owners and lift contractors) participating in trial accounted for **more than 90% of new lifts projects** in Singapore
- Critical non-compliances were found relating to “**hard-to-rectify**” requirements



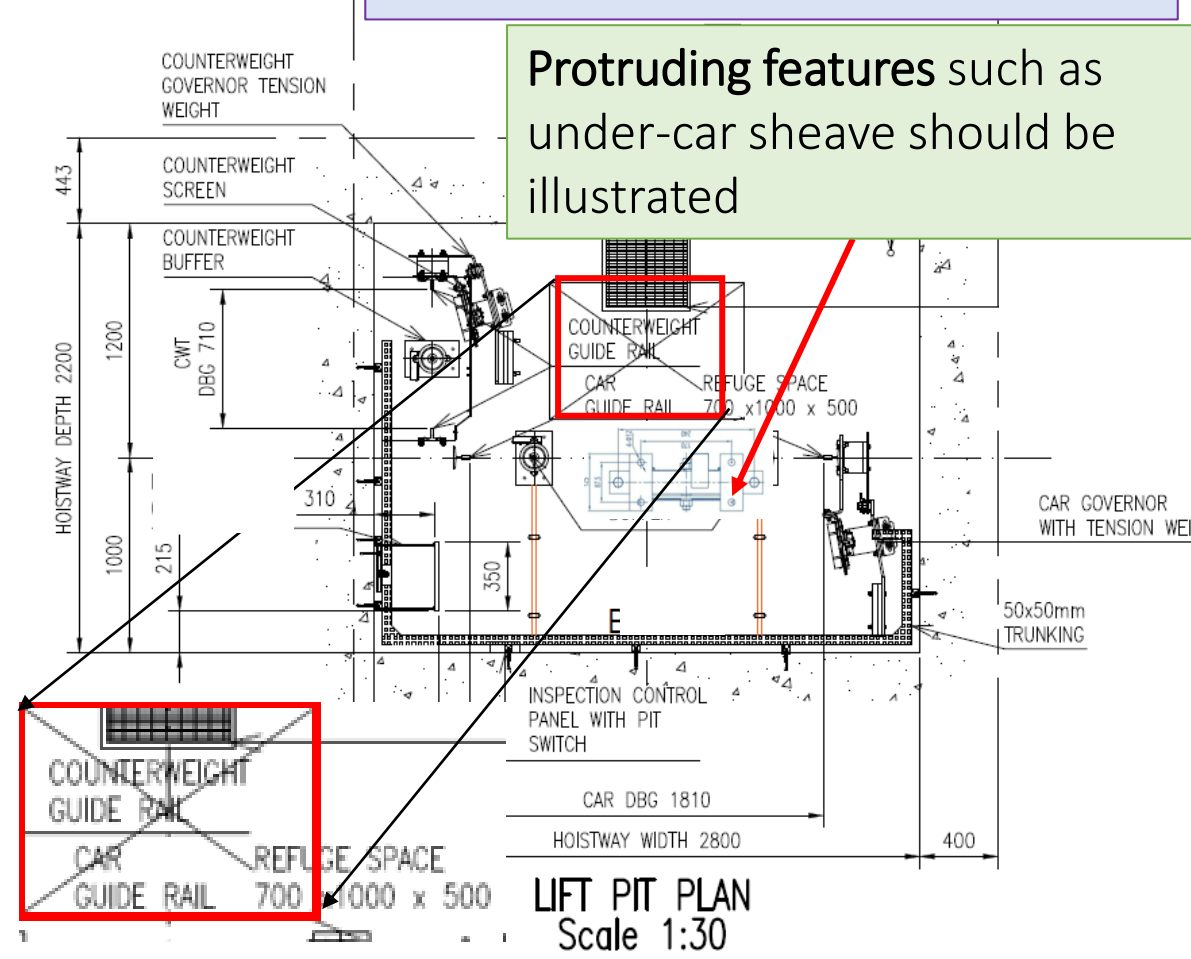
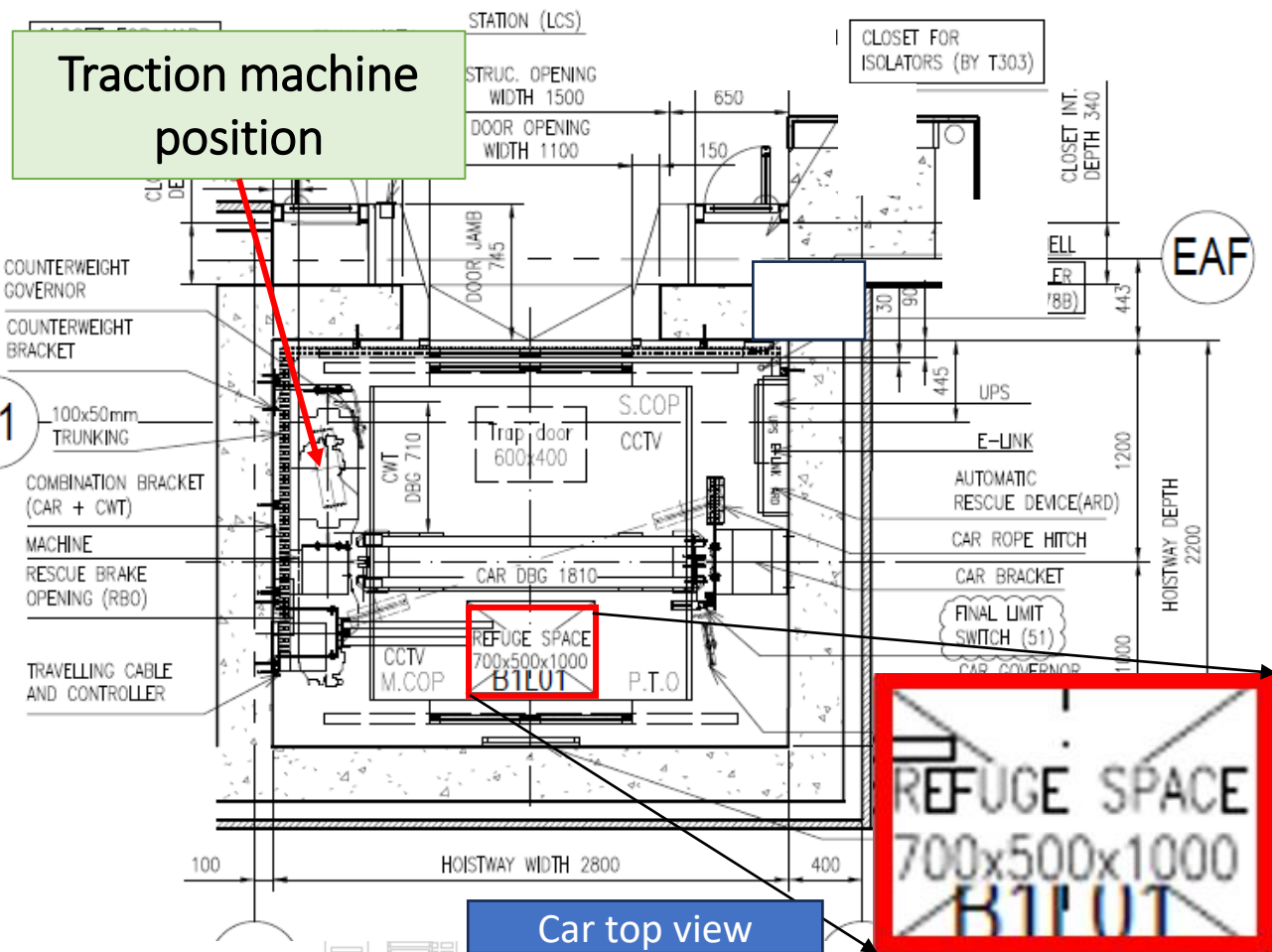
Observations from Trial

Requirement

Refuge Space

The refuge space should be shown with buffer fully compressed

Protruding features such as under-car sheave should be illustrated



Car top view

Lift Pit view

REFUGE SPACE
700x500x1000
B1101

Refuge space dimensions marked out clearly



Observations from Trial

Requirement

Refuge Space

- One trial model included “empty box” to show refuge space at lift pit

Work with Lift Service Contractors to:

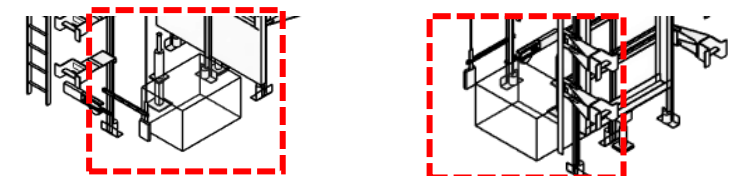
- Ensure that **exact refuge space dimension are provided** at the confirmed areas of lift pit or car top for refuge space
- Counter measure against underside of soffit (car top) or car bottom to ensure there is sufficient refuge space according to SS 550

Table 4 – Dimensions of refuge spaces in the pit

| Type | Posture | Pictogram | Horizontal dimensions of the refuge space (m x m) | Height of the refuge space (m) |
|------|-----------|-----------|---|--------------------------------|
| 1 | Upright | | 0,40 x 0,50 | 2,00 |
| 2 | Crouching | | 0,50 x 0,70 | 1,00 |
| 3 | Laying | | 0,70 x 1,00 | 0,50 |

Key for pictograms
 ①: black colour
 ②: yellow colour
 ③: black colour

SS 550 : 2020



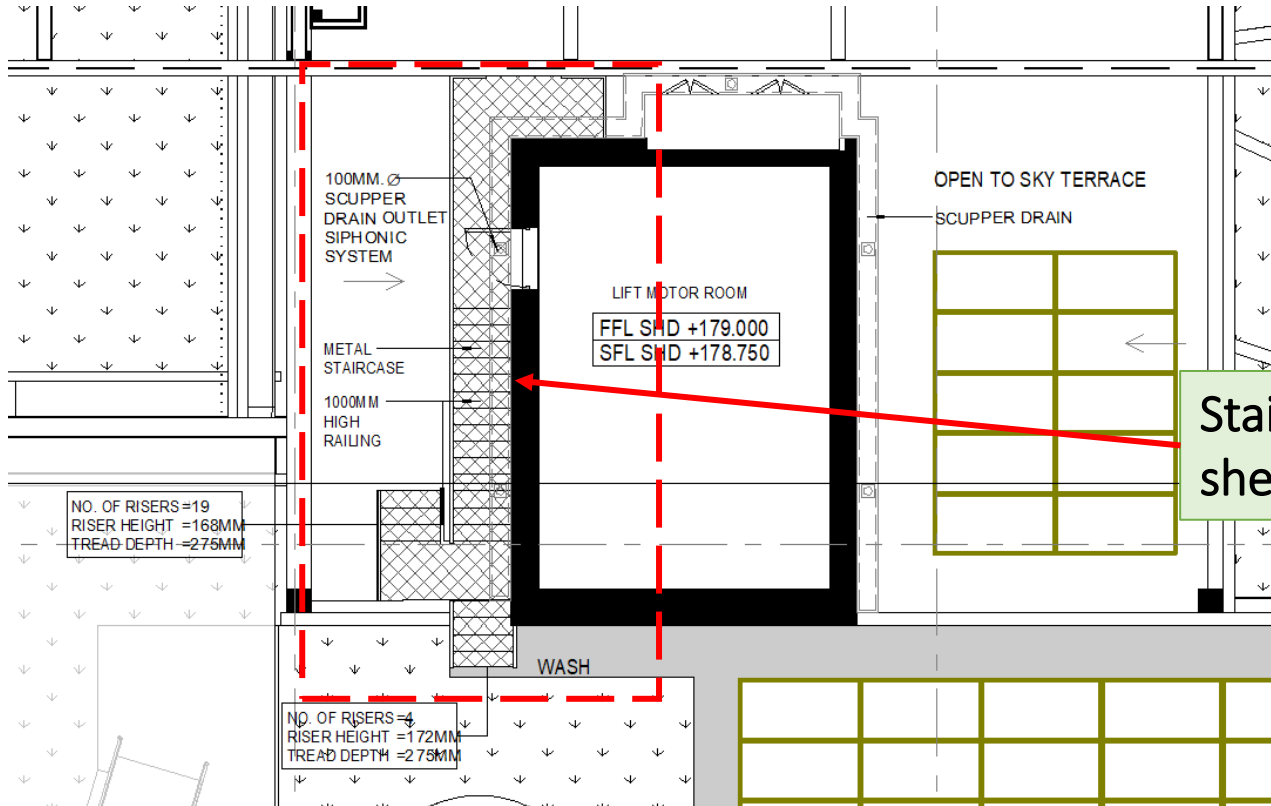
Refuge Space



Observations from Trial

Requirement

Access pathway to motor room at rooftop



Multiple sites submitted after July 2021 were found **without sheltered access** to roof top for access to lift motor room

Staircase Access not sheltered

SS 550 : 2020

5.2.2.5 A safe access for persons to machinery spaces and pulley rooms shall be provided. Passageway shall be sheltered with a clear width of 1.0 m and clear height of 2.0 m. Access floor shall be treated such that it is not slippery and safety railings provided along passageway if it is less than 1.5 m from edge of roof/building. For difference in height in the access passageway, this should be effected entirely by way of stairs. In the exceptional case when a conventional staircase cannot be provided, ladders satisfying the following requirements shall be used:



Observations from Trial

Requirement

Access pathway to motor room at rooftop

- Trial model submitted only showing lift components and model
 - Lift is with motor room but access pathway (staircase, door, sheltered corridor) is not shown
 - No issue for motor-room-less lifts

Work with Lift Service Contractors to:

- Ensure safe access is designed for
- Ensure lift access to motor room is shown clearly in design plans/BIM models

SS 550 : 2020

5.2.2.5 A safe access for persons to machinery spaces and pulley rooms shall be provided. Passageway shall be sheltered with a clear width of 1.0 m and clear height of 2.0 m. Access floor shall be treated such that it is not slippery and safety railings provided along passageway if it is less than 1.5 m from edge of roof/building. For difference in height in the access passageway, this should be effected entirely by way of stairs. In the exceptional case when a conventional staircase cannot be provided, ladders satisfying the following requirements shall be used:

Access pathway not shown

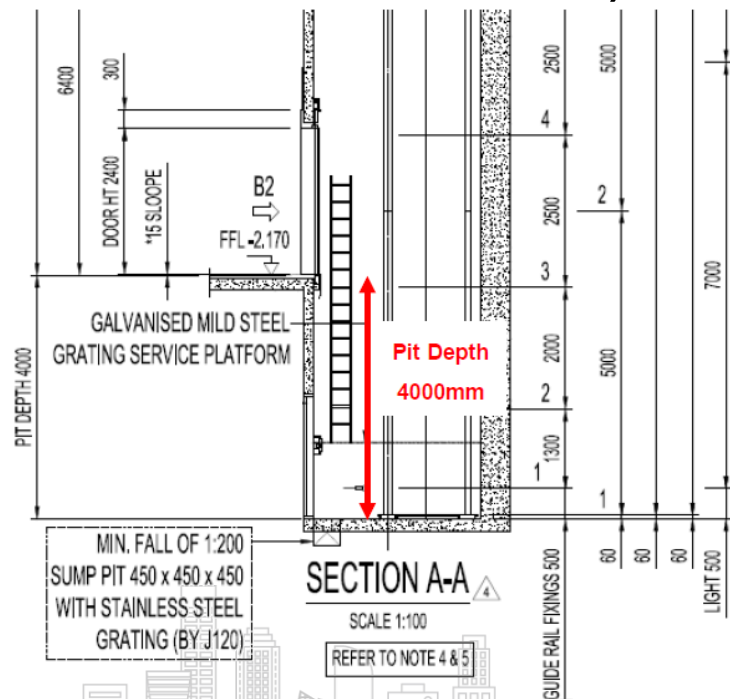


Observations from Trial

Requirement

Access door to enter lift pit where depth exceeds 2.5m

- Lift contractor **not yet engaged** yet maintenance space will be used by them
 - QPs (architect and civil PE) and developer **need to consider lift design requirements** and not force the non-compliances on the lift contractors to settle
 - Consult lift contractors early to better understand the **intent of requirements**



SS 550 : 2020

5.2.2.4 A means to enter the pit shall be provided consisting of;

- an access door where the pit depth exceeds 2,50 m;
- either an access door or a ladder inside the well, easily accessible from the landing door, where the pit depth is not exceeding 2,50 m.

Any pit access door shall comply with the requirements of 5.2.3.

Pit ladder instead of access door provided

Observations from Trial

Modelling

Level of “Details”

- Trial models included components that were **overly detailed** which added to the overall file size
- Detailed components feature (bolt, screw, complicated shapes...) **not necessary** if dimensions provided are accurate and parameters are provided
 - Opening and amending the large model will **take a longer time** during discussion with other project parties

Work with Lift Service Contractors to:

- Determine the **required details** for components to be shown in BIM

Bolts/screws/wiring



Findings from Testing and Commissioning (T&C) Audits for New Lift Installations

Overview, Process, Scheduling Issues and Observations from Trial



Overview

PTO is delayed

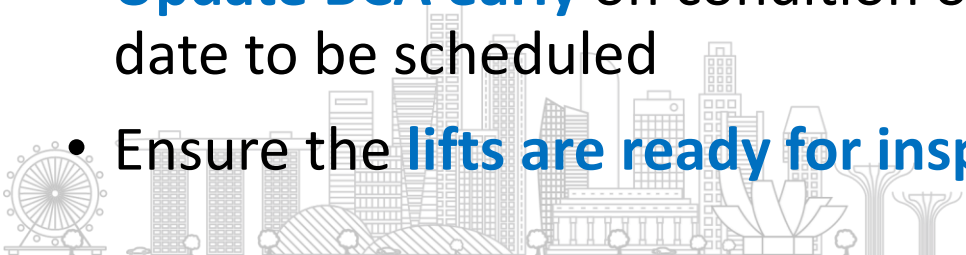
Other firms' sites are delayed

Started early 2023

- **TOP was delayed** due to PTO not issued as full compliance is required
- **Observations**
 - Some sites were **not ready** on day of inspection
 - Power supply not connected, no lift testers present, no lift test weights
 - A number of SPEs **did not supervise** the examination, inspection, testing and commissioning carried out by the contractors
 - **43%** of sites were found to have **non-compliances with** code

Work with Lift Service Contractors to:

- **Update BCA early** on condition of site and request an audit date to be scheduled
- Ensure the **lifts are ready for inspections by BCA**



Common findings

Controller must be properly sheltered

- **No proper shelter** for equipment from weather elements

Such improper installations will hinder **maintenance or rescue work** and also cause **reliability** issue to the lift system (e.g. frequent breakdown due to overheating)

Controller exposed to element

5.2.6.3.2 Dimensions

5.2.6.3.2.1 The dimensions of machine rooms shall be sufficient to permit easy and safe working on equipment.

In particular there shall be provided at least a clear height of 2,10 m at working areas, and:

- a) a clear horizontal area in front of the control panels and cabinets. This area is defined as follows:
 - 1) depth, measured from the external surface of the enclosures, at least 0,70 m;
 - 2) width, the greater of the following values: 0,50 m or the full width of the cabinet or panel;

3.27

machine room

fully enclosed machinery space with ceiling, walls, floor and access door(s) in which machinery as a whole or in parts is placed



Common findings



DON'T

- Earthing cable for supply not connected at the distribution board



Without earth connection, the lift system is not protected by the earthing protection in the building. This is very dangerous for all personnel working on or using the lift.

Proper connection to building earth should be **ensured** before turning on the power for the lifts.



DO

Common findings

Ventilation opening too small

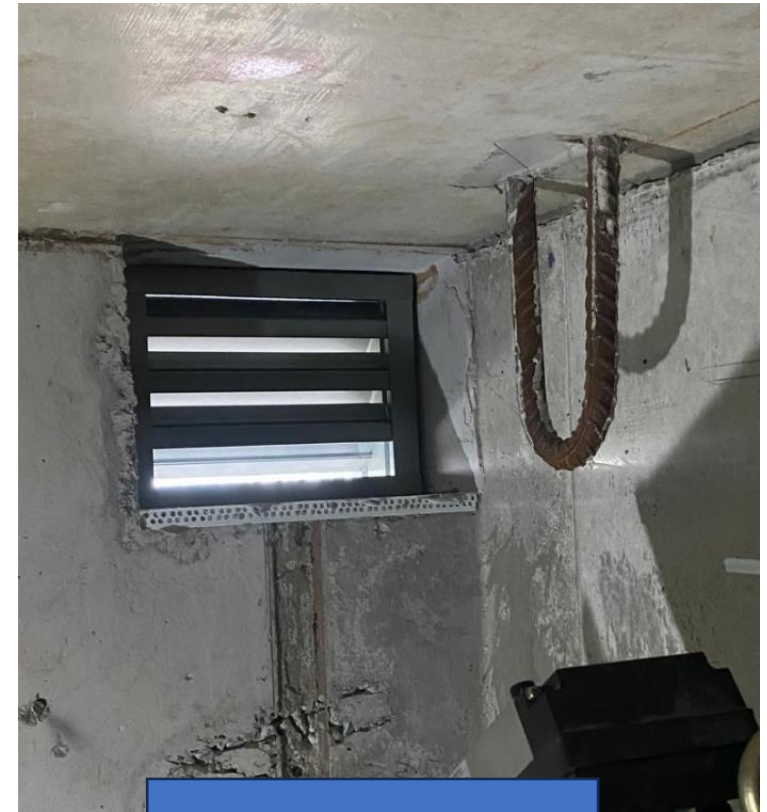
5.2.1.3.2 Lift wells shall be adequately ventilated to the external air, by means of one or more permanent openings provided at the topmost part of the well, having a total unobstructed area of at least 1 % of the horizontal section of the well and not less than 0.1 m² for each lift in the well.



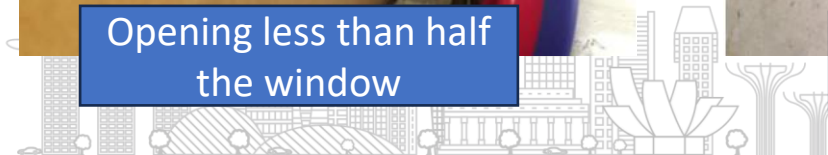
Opening less than half the window



At top of lift well



After rectification



Waiver/Alternative Solutions for Lift and Escalator

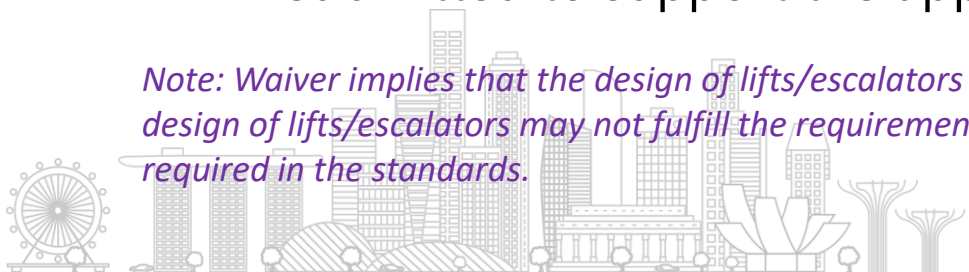
Preparing for waiver/alternative solution applications



Work with Lift/Escalator contractors early

- Many non-compliances **can be avoided**
 - if lift/escalator contractors are **engaged early** during planning or design stage
- If unable to comply, submit a **waiver or alternative solution** as early as possible (based on merits of the case)
- For alternative solution, must demonstrate able to meet the **performance requirements** of the code and **no additional risks are introduced**
 - Proper substantiations in consultation with lift contractor and Specialist Professional Engineer (Lift and Escalator Engineering)
 - Actual project reference number and project specific drawings should be submitted to support the application

Note: Waiver implies that the design of lifts/escalators deviate from the requirements in the standard. Alternative solution implies that the design of lifts/escalators may not fulfill the requirements in the standards but still meet an equivalent level of performance and safety required in the standards.



Preparing for Waiver/Alternative Solution Applications

Documents required (non-exhaustive)

Comparison Chart for SS550:2009 and Home Elevator

| Clause | SS 550 : 2009 | Applicable / Not applicable | Remarks |
|---------|---|-----------------------------|--|
| 1 | General | Not applicable | Positive drive (drum winding drive) for home lift which is excluded in the scope of SS550. |
| 1.1 | Scope | - | - |
| 1.2 | Purpose | - | - |
| 1.3 | Normative references | - | - |
| 2 | Definitions and terminology | Applicable | Only for common lift terminology. |
| 3 | Lift well | - | - |
| 3.1 | General | - | Not scope of work for lift equipment – To comply by Builder |
| 3.2 | Emergency access | Not applicable | Distance between sills are less than 11m. |
| 3.3 | Internal surface | - | Not scope of work for lift equipment – To comply by Builder |
| 3.4 | Construction materials | - | Not scope of work for lift equipment – To comply by Builder |
| 3.5 | Fire-resistance rating | Not applicable | Non-fire rated doors because of not required in Fire code group 1 Small Residential Buildings. |
| 3.6 | Non-fire-resistance construction | Not applicable | Lift is installed inside building. |
| 3.7 | Smoke-tightness of lift well | Applicable | Completed |
| 3.8 | Vent openings in lift well | Completed | Not scope of work for lift equipment – To comply by Builder |
| 3.9 | Totally enclosed well | - | Not scope of work for lift equipment – To comply by Builder |
| 3.10 | Partially enclosed well | - | Not scope of work for lift equipment – To comply by Builder |
| 3.11 | Lighting of the well | Applicable | Completed |
| 3.12 | Lift pit | - | - |
| 3.12.1 | Access to pit | Not applicable | Pit depth is less than 1000mm and thus, cat ladder is not required. |
| 3.12.2 | Lighting of pit | Applicable | Completed |
| 3.12.3 | Dryness of pit | - | Not scope of work for lift equipment – To comply by Builder |
| 3.12.4 | Pit floor | - | Not scope of work for lift equipment – To comply by Builder |
| 3.12.5 | Minimum pit depth | Not applicable | Refer to clause 10.1 |
| 3.12.6 | Adjacent lift pits | - | Not scope of work for lift equipment – To comply by Builder |
| 3.12.7 | Switched socket outlet | Applicable | Completed |
| 4 | Machine and pulley spaces | - | - |
| 4.1 | General Provision | - | Not scope of work for lift equipment – To comply by Builder |
| 4.2 | Access | - | - |
| 4.2.1 | Access route to the machine and pulley spaces | - | - |
| 4.2.2 | Final access to the machine and pulley spaces | - | - |
| 4.3 | Protection against machinery in machine and pulley spaces | - | - |
| 4.4 | Machinery inside working areas in machine and pulley spaces | - | - |
| 4.5.1.1 | The dimensions of the machine and pulley spaces | - | - |
| 4.5.1.2 | Maintenance work | - | - |
| 4.5.1.3 | Clearance | - | - |
| 4.5.1.4 | Height | - | - |

Clause by Clause Comparison table of requirements against SS 550

Product Catalogue and Type Test certificates

Project drawings

Maintenance manual and other reports



Study on minimizing noise from lifts operations in Residential Developments

Preliminary sharing



Overview

Increased installation of motor-room less lifts

Residential units located near to lift shafts

- Increasing number of feedback from residents with regard to noise over the years
- Growing trend of building designers placing **lift shaft wall abutting residential units**
- Lift machine and brakes at top floor or roof top machine room
- Noise generated mostly from machine braking and/or vibrations of guiderail during travelling
- Currently unregulated and requirements not prescribed in SS 550 : 2020
- Needs to be addressed at **planning and design stage**



Minimise noise (Bedroom Low Floor)

Condominium

5 storey with motor room less lift

Common lift abuts dwelling unit bedroom and living room

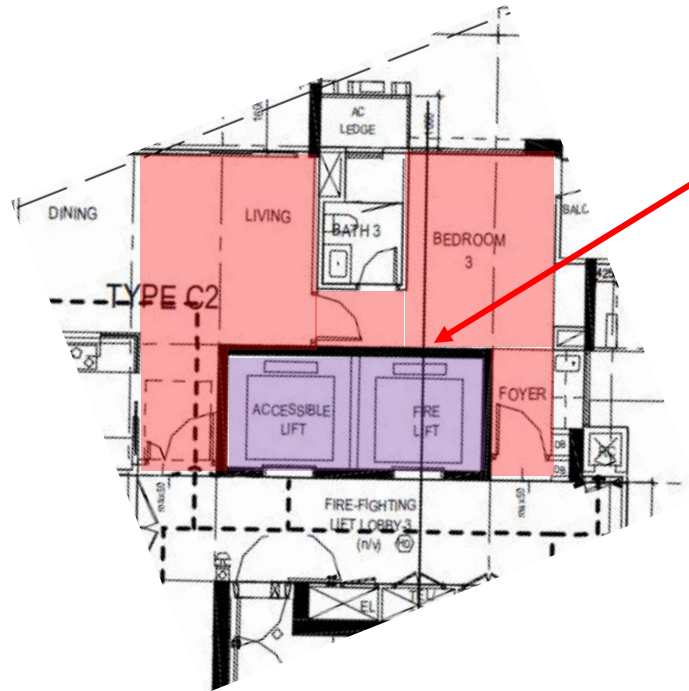
Lift wall thickness: 200mm



Minimise noise (Bedroom High Floor)

Condominium

17 storey with motor room less lift



Common lift abuts dwelling unit living/bedroom

Lift wall thickness:
200mm

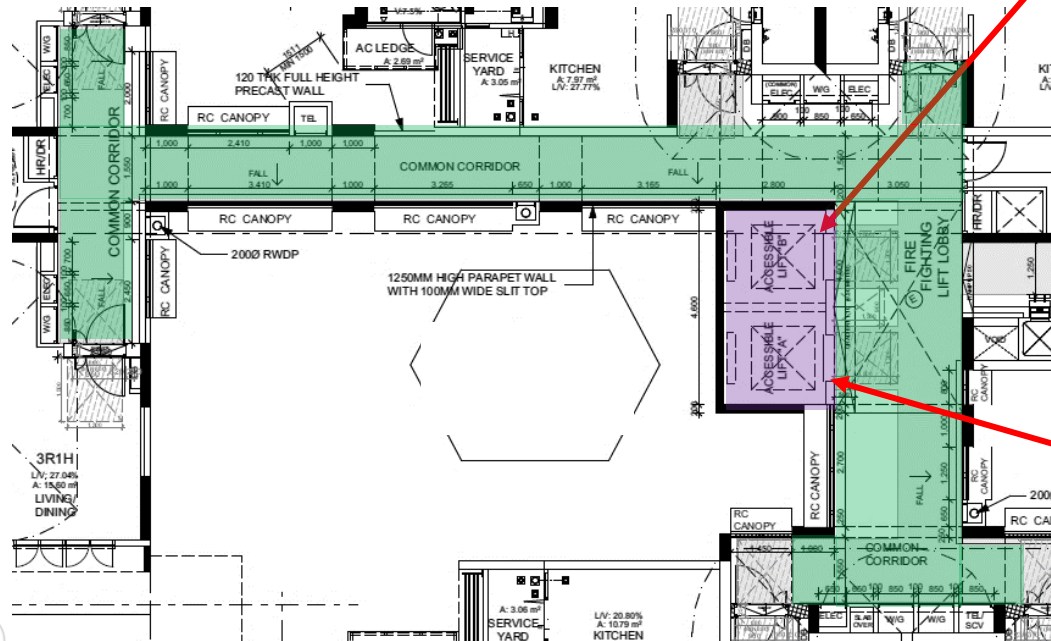


Minimise noise

Engage “noise consultant”

Use common corridor to create “buffer”

Common lift away from Dwelling Unit



Evaluate suitability of lift location with help of acoustics expert especially if tight plot



Summary

Briefs

- QPs and developers are encouraged to **engage Lift Service Contractor as early as possible**
 - Include “hard to rectify” requirements such as roof access and sheltered machinery spaces
 - Coordinate with lift contractors to schedule T&C audit inspections with BCA to clear “bottleneck” early as rectifications may be required
 - Familiarize with lift installations/T&C process to obtain PTO (and TOP) early
 - Work closely with lift contractors to ensure **full code compliance** during planning and design stage
 - Avoid designing lift shaft or machine room adjacent to living spaces or bedrooms



Thank You



@BCASingapore

