Sustainable Building Design Guidelines

This practice note promulgates guidelines on building design which will enhance the quality and sustainability of the built environment in Hong Kong. These guidelines are the Sustainable Building Design Guidelines (SBD Guidelines) referred to in Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) APP-151, the compliance with which the Building Authority (BA) will take into account, where applicable, as a pre-requisite in exempting or disregarding green and amenity features and non-mandatory/non-essential plant rooms and services from gross floor area and/or site coverage calculations (GFA concessions) for new building developments. Terminology used in the SBD Guidelines is listed in Appendix A.

Objectives

2. The SBD Guidelines establish 3 key building design elements to enhance the environmental sustainability of our living space. They are building separation, building setback and site coverage of greenery. The objectives are to achieve better air ventilation, enhance the environmental quality of our living space, provide more greenery, particularly at pedestrian level; and mitigate the heat island effect.

Building Separation

3. In order to improve air ventilation, enhance the environmental quality at pedestrian level and mitigate heat island effects arising from the undesirable screening effect of long buildings at different levels, building sites of the following categories should comply with the building separation requirements:

(a) sites that are 20,000m^2 or above; or

(b) sites that are less than 20,000m^2 and proposed with building or group of buildings having a *continuous projected façade length (Lp)* of 60m or above.

4. Building separation requirements for each *assessment zone*:

(a) Design Requirement (1) – *Lp*

The *Lp* of a building or group of buildings along a *street* should not exceed the maximum permissible[1] which is calculated based on 5 times the *mean width of street canyon (U)*; and

/(b) ...

[1] See Appendix B for computation of maximum permissible *Lp*

(b) Design Requirement (2) – *Separating Distance (S)* and *Permeability (P)*

(i) The *P*, comprising a minimum of 2/3 *Intervening Space (IS)* and a maximum of 1/3 *Permeable Element (PE)*, assessed on two vertical projection planes for the two categories of sites should not be less than those as shown in Table 1.

(ii) Along the chosen projection planes, the *S* for the *IS* between the projected façade of the building and the site boundaries or the centreline of adjoining *streets* / lanes should not be less than 7.5m wide; and

(iii) If such *IS* are not sufficient to meet 2/3 of the *P*, additional *IS* with *S* not less than 15m wide can be provided between 2 projected building façades for making up.

Table 1

Height (H) of the tallest building	Minimum P of buildings in each *assessment zone* on two projection planes		
	Site area < 20,000m^2 and with Lp ≥ 60m	Site area ≥ 20,000m^2	
	Each Plane	Plane 1	Plane 2
H ≤ 60m	20%	20%	25%
H > 60m	20%	20%	33.3%

5. Detailed requirements and method of measurement on *Lp, S* and *P* are given in Appendix B.

6. Standalone residential building blocks of height not exceeding 15m can be exempted from the building separation requirements and disregarded in the assessment of such for other buildings.

Building Setback

7. In order to improve air ventilation, enhance the environmental quality at pedestrian level and mitigate street canyon effect, buildings fronting a *street* less than 15m wide should be set back to comply with one of the following requirements:

(a) For maintaining a ventilation corridor with minimum section of 15m x 15m, no part of the building up to a level of 15m above the *street* level should be within 7.5m from the centreline of the *street* as shown in Figures C1 and C2 of Appendix C. Where level of a *street* varies, the minimum sectional area should be kept along the full frontage following the profile of the *street*.

/(b) ...

(b) Where a cross-ventilated communal podium garden with a clear height of not less than 4.5m is provided, no part of the building up to a level of 15m above the *street* level, should protrude above the 45° inclined plane, the base of which is placed at *street* level at the site boundary line on the opposite side of the *street* as shown in Figures C3 and C4 of Appendix C.

Typical examples on the application of building setback requirements are given in Figures C5 to C9 of Appendix C.

8. In determining the compliance with the setback requirement, the BA may take into account the following factors:

(a) Structures higher than 15m above the *street* level may be allowed to build over the setback area[2]. If the setback area is uncovered, a canopy that complied with regulation 10 of the B(P)R may be permitted;

(b) Minor projecting features and signboards projecting not more than 600mm from the external walls and at a clear height of not less than 2.5m above the *street* level; and single-storey footbridges across the setback area may also be permitted;

(c) Columns supporting the building above may be permitted within the setback areas subject to requirements as shown in Figure C2 of Appendix C; and

(d) The setback area should be properly landscaped and paved, and be open without any permanent building structures other than landscaped features, perforated balustrades, perforated boundary walls and structural columns.

9. Buildings may be exempted from whole or parts of the building setback requirement with reference to a *street* where its height[3] is less than 2 times the mean width of the *street*.

Site Coverage of Greenery

10. In order to improve the environmental quality of the urban space, particularly at the pedestrian level and to mitigate the heat island effect, sites with areas of 1,000m^2 or more should be provided with *greenery areas* in accordance with Table 2. Detail guidelines are provided in Appendix D.

/Table 2 ...

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[2] The setback area at ground level under the footprint of such structures or the covered areas under the canopy may be exempted from GFA calculation if it is designated as common parts accessible by occupants of the building and without any commercial activities.

[3] Height of the building in this context is measured from the mean level of the *street* on which the building abuts to the mean height of the roof over the highest usable floor space in the building.

Table 2

Site Area	Minimum Site Coverage of Greenery	
	Primary zone	Overall
1,000 m^2 – 20,000 m^2	10%	20%
≥ 20,000 m^2	15%	30%

11. This requirement is not applicable to sites with a single family house only.

Special Considerations

12. There are special circumstances in which genuine difficulties in complying with the SBD Guidelines may be encountered. Examples include new buildings serving special functions such as ferry piers, railway terminals, stadia; and conversion of existing buildings to new buildings especially the adaptive reuse of historic buildings where building façades or even layout are character defining elements. In recognition of such genuine constraints in meeting the prescriptive requirements, the BA takes a flexible and pragmatic stance when considering applicants' proposals holistically to achieve the objectives of the SBD Guidelines. Alternative approaches are provided in Appendix E.

Conditions for Approval

13. PNAP APP-151 specifies the compliance with the SBD guidelines as one of the pre-requisites for granting GFA concessions. When granting such modifications under section 42 of the Buildings Ordinance, the BA may impose relevant conditions for assuring the sustainability of the approved building design.

Information to be Submitted

14. To demonstrate compliance with the building separation, building setback and site coverage of greenery requirements, information as detailed in Appendix F should be submitted.

15. To increase the transparency of information to the public, plans and details showing the site coverage of greenery as described in Appendix F will be uploaded to the BD's website after the occupation permit is issued.

(YU Po-mei, Clarice)
Building Authority

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Appendix A
(PNAP APP-152)

Terminology

Air Ventilation Assessment (AVA)	*Air ventilation assessment (AVA)* is a protocol to objectively assess the effects of planning and development proposals on external air movement for achieving a better pedestrian wind environment. An advisory framework for the methodology to undertake *AVA* has been outlined in the Technical Guideline for Air Ventilation Assessment available in the Planning Department's website under the Hong Kong Planning Standard and Guidelines.
Assessment Zones	*Assessment zones* demarcate the vertical spatial division for assessing fulfilment of the building separation requirement. The zonal division consists of low zone (within 20m from level zero), middle zone (20-60m from Level Zero) and high zone (higher than 60m from Level Zero). [Building Separation]
Computational Fluid Dynamics (CFD)	*CFD* is a branch of fluid mechanics using numerical methods and algorithms to solve and analyze problems that involve fluid flows. Computers are used to perform the millions of calculations required to simulate the interaction of fluids and gases with the complex surfaces used in engineering.
Continuous projected facade length (Lp)	The total projected length of facade of a building or a group of buildings if separation between them is less than 15m. (see Figures B2 & B3 of Appendix B) [Building Separation]
Grass paving	Paving having not less than 50% of floor designed for the growth of grass or groundcovers. [Site Coverage of Greenery]
Greenery area	Area with live plants and soil or similar base. Such area may include other greening features as per Appendix D. [Site Coverage of Greenery]
Intervening Space (IS)	Space that is open to above or have a clear height of not less than 2/3 of the height of the respective assessment zone. [Building Separation]
Level Zero	The mean *street* level on which the site abuts or where the site abuts *streets* having different levels, the mean level of the lower or lowest *street*. [Building Separation]
Mean Width of Street Canyon (U)	The mean distance between (i) an external wall of the subject building which is within 30m perpendicular from the centre line of a *street* and (ii) the boundary of the other site on the opposite side of the *street*, as shown in Figures B4 to B7 of Appendix B. It forms the basis for assessing the maximum permissible Lp of the building in the assessment zone, which is 5x*U*. [Building Separation]
Primary Zone	The 15m vertical zone of a site along the abutting street level. The greenery in this zone is for providing visual contacts or access from a street through common parts of the building for enhancing the walkability of urban space to the public, visitors or occupiers. The top level of soil or similar base for planting should be taken as the reference level for inclusion in the Primary Zone. [Site Coverage of Greenery].
Permeability (P)	A percentage indicating how permeable a building or group of buildings in that assessment zone is. It is obtained by dividing the sum of the areas recognized as *intervening space* or *permeable elements* by the area of the assessment zone as shown in Figure B9 of Appendix B. [Building Separation].

Permeable Element (PE)	Space provided within, above, below or between buildings within the same site with a minimum clear width and clear height of 3m as projected onto the chosen projection plan, e.g. refuge floors, communal sky gardens etc. [Building Separation]
Separating Distance (S)	This is the minimum width of an *IS* in the following scenarios:- (i) between end of the projected building façade and the site boundary; (ii) between end of the projected building façade and the centerline of adjoining *street*/lane where the site abuts; or (iii) between 2 projected building facades. Where such distance varies for an *IS*, the method of arriving at the mean of such distance is shown in Figure B12 of Appendix B. [Building Separation]
Site Coverage of Greenery	The percentage of total live *greenery area* divided by the area of the site.
Street	A *street* of width not less than 4.5m vested in the Government and maintained by the Highways Department or a private street on land held under the same Government lease as the site and under the terms of the lease, the lessee has to surrender (when required to do so) the land on which the street is situated to the Government, as described under B(P)R18A(3)(a)(i) & (ii). [Building Separation and Building Setback]
Vertical greening	Greenery that grows on a vertical surface. [Site Coverage of Greenery]

(Rev. 9/2023)

Appendix B
(PNAP APP-152)

Building Separation Requirements

1. Assessment and Method of Measurement

1.1 The design of building(s) above *Level Zero* of the site shall comply with the Design Requirements (1) and (2) below. They shall be assessed separately for each of the three *assessment zones* i.e. the low, middle and high zones.

1.2 In general, all measurements for building separation are taken from the external walls of the building. Minor building features that will not materially affect air ventilation around buildings, including single-storey footbridges across buildings (not shadowed vertically by other footbridges), signboards, minor projecting features as described in paragraph 3 of PNAP APP-19, open sided features such as balconies, utility platforms, covered walkways, trellises and other highly permeable features such as railing and perforated fence walls (with free area $\geq$ 2/3 or equivalent) may be disregarded in the building separation assessment. Minor noise barriers that are not extensive in height and designed to permit air flow through or over the barriers may also be disregarded subject to the provision of appropriate building features or permeable elements such as communal podium gardens to compensate for the barrier's obstruction to free air flow to the satisfaction of the BA.

1.3 Effect on air ventilation around buildings due to topographical features in a site including any slope features and retaining walls may be disregarded. Any parts of a building that are below the original site topography may therefore be disregarded from the *assessment zone* (see Figure B1).

2. Design Requirement (1) - *Lp* of building(s) abutting a *street*

2.1 Design Requirement (1) controls the maximum *Lp* of a building or a group of buildings if any part of the building is within 30m from the centreline of the *street* on which the building(s) abuts.

2.2 The *Lp* of a building or a group of buildings along its long side shall not exceed the maximum permissible *Lp* which is obtained by multiplying 5 and the *U* on which the building(s) abuts. The *U* of such a street canyon in the *assessment zone* is measured perpendicular to the centreline of the *street* from the external wall of the building that is within 30m from the centreline of the *street*, to the site boundary of the other site on the opposite side of the *street* (see Figures B2 to B6). If the building or group of buildings abuts two or more *streets* having different *U*, the least *U* shall be adopted.

2.3 If the width of a street canyon varies (on plan), *U* is the width obtained by dividing the area of such a street canyon by its length as measured along the centreline of the *street*. If only a part of the building is within 30m from the centreline of the *street*, *U* is the mean width of the street canyon that abuts such part of the building. If there is more than one such street canyon along the same *street*, *U* is the width obtained by dividing the sum of the areas of such street canyons by the sum of the lengths, as measured along the centreline of the *street*, of such street canyons (see Figure B7).

2.4 For the purpose of measuring *Lp* of a building or a group of buildings along its long side, the part of the building(s) that is within the low zone and of a height of not more than 6.67m (i.e. 1/3 of 20m which is the height of the low zone) may be disregarded.

2.5 Maximum permissible *Lp* is not applicable for Design Requirement (1) in the following circumstances:

(a) The subject site does not abut a *street;*

(b) There is no building or no parts of building in the *assessment zone* within 30m from the centreline of any *streets* on which the site abuts.

3. Design Requirement (2) - *S* & *P* of Buildings (Projection Planes for Assessment)

3.1 Assessment on compliance with Design Requirement (2) shall be made through a pair of vertical projection planes (x, y) at an orthogonal relationship to each other (see Figure B8). At least one of the projection planes for the low zone shall be set parallel to a *street* on which the site abuts. For a site that abuts on a curvilinear *street*, the projection plane for the low zone shall be set along any tangent of the *street*. For the middle/high zones, such pair of projection planes may be set to suit the building disposition or the site wind environment.

3.2 To allow more flexibility in building design, the angle between each pair of projection planes may vary from 75 to 105 degrees.

3.3 For a site that is less than 20,000 m^2 and the total width of all projected building facades exceeds 60m along one projection plane only, assessment on compliance with Design Requirement (2) is only required for that projection plane.

4. Assessment of *S* and *P*

4.1 Elevation of all buildings within the site shall be projected onto the chosen projection planes. On each projection plane, the required *P* of buildings as stipulated in Table 1 of this PNAP shall be achieved (see Figure B9).

4.2 Not less than 2/3 of the required *P* shall be provided by *IS* between the ends of the projected building facades and the adjacent site boundaries or, where the site abuts a street or a lane, the centreline of adjoining *street* or lane[1]. Save for the part of building disregarded in paragraph 2.4 above, such *IS* shall provide a *S* of not less than 7.5m wide. For *S* involving site boundary or adjoining street/lane, if it varies on plan, the mean of *S* shall not be less than 7.5m and no part of the building shall be within 3m from the boundary line. If such *IS* cannot meet 2/3 of the required *P*, additional *IS* can be provided between buildings. Such additional *IS* shall have an *S* of not less than 15m (see Figures B10 to B12).

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[1] The *street*/lane of width less than 4.5m may also be included in the assessment of *S* and *P*. Open space outside the site boundary is not accountable for *P*. However, where an area is zoned as open space on the Outline Zoning Plan / Development Permission Area Plan and provided such area is a nullah or designated as promenade or non-building area on the aforesaid plan and / or in the explanatory notes of the aforesaid plan, such area may be treated as a lane for the purpose of assessing *S* and *P*.

4.3 Not more than 1/3 of the required *P* may be provided by *PE*. (see Figures B10 & B11)

4.4 To allow more design flexibility, the projection line of the *IS* within an *assessment zone* may follow the path of a notional air corridor that starts at 90° from the projection plane (on plan). The air corridor may flow between buildings and may change direction without changing its width, when it meets the boundary line or anywhere within the site, by not more than 15° provided the direction of the air corridor after the change of course is always within 15° from its original path before it enters the site. The minimum width of the air corridor along its path between buildings shall not be less than 15m (see Figures B13 to B16).

4.5 When the site is large and / or of irregular shape, the site may be subdivided into two or more notional sites provided that the line of the sub-division is located along the centreline of a notional wind path that complies with the following requirements:

(a) the wind path is open to above from the lowest level of the subject *assessment zone* (disregarding the minor projecting features and permeable features mentioned in paragraph 1.2 above);

(b) it is of a width of not less than 15m;

(c) it is continuous across the site in one direction or it may change in direction by not more than 15 degrees provided its direction after the change of course is always within 15 degrees from its original path[2];

(d) where it meets the site boundaries, there is a street or lane with a mean width of not less than 7.5m.

4.6 After subdividing the site, the *P* may be assessed separately for each subdivided site using the same or a different pair of orthogonal projection planes (see Figures B17 & B18).

4.7 A sample case on assessment of building separation provisions is given in Figures B19 to B21.

(Rev. 1/2016)

[2] The wind path should preferably align with the summer prevailing wind direction or existing street pattern.

Appendix B
(PNAP APP-152)

Site Topography & Sunken Buildings

- "Level Zero" is the mean level of the lower or lowest street(s).
- The height of a building shall be measured from Level Zero to the mean height of the roof over the highest usable floor space.
- The effect on air ventilation around buildings due to topographical features or sunken part of a building below Level Zero shall be disregarded. (See Fig.B9-Fig.B11)

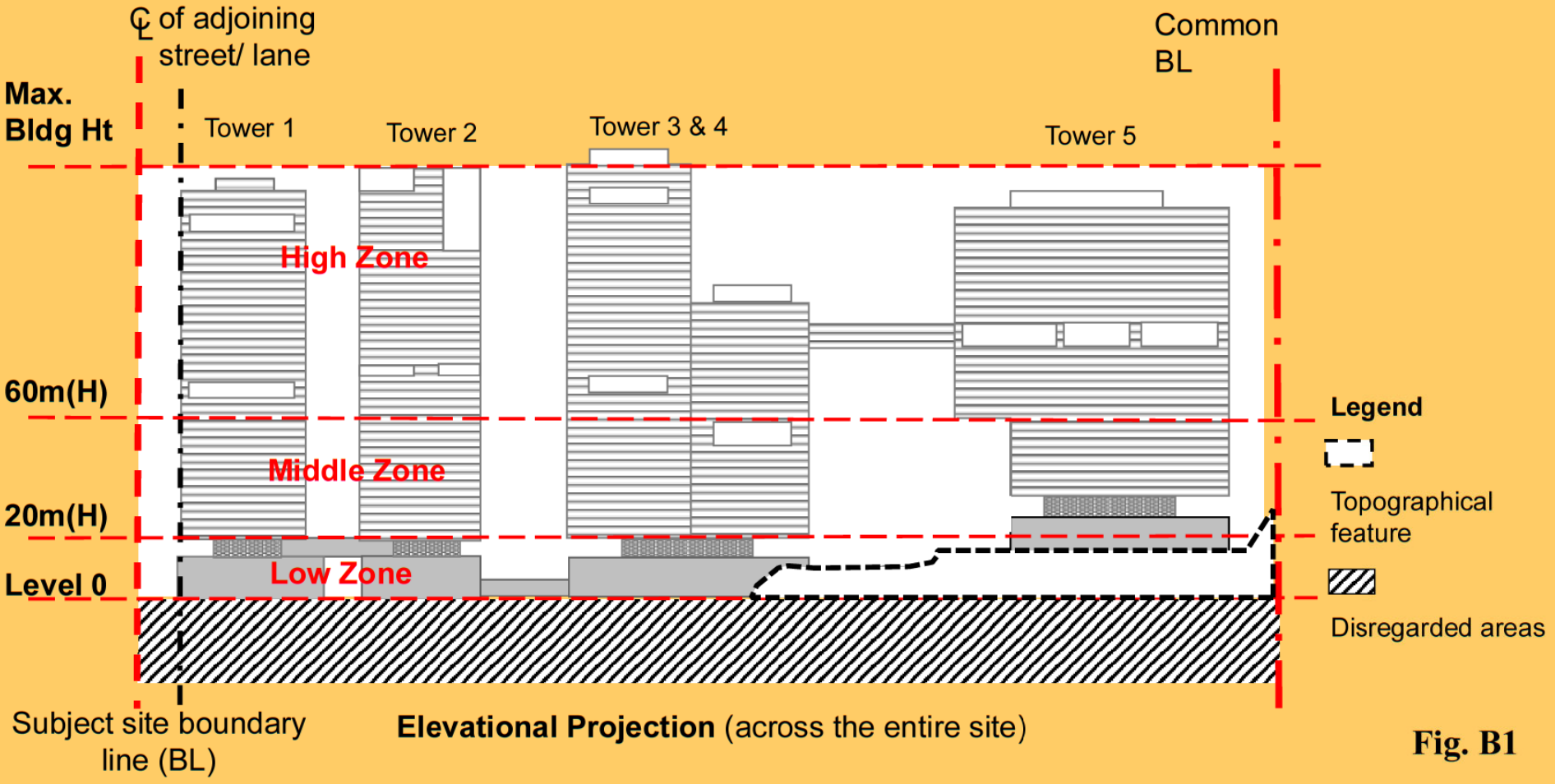
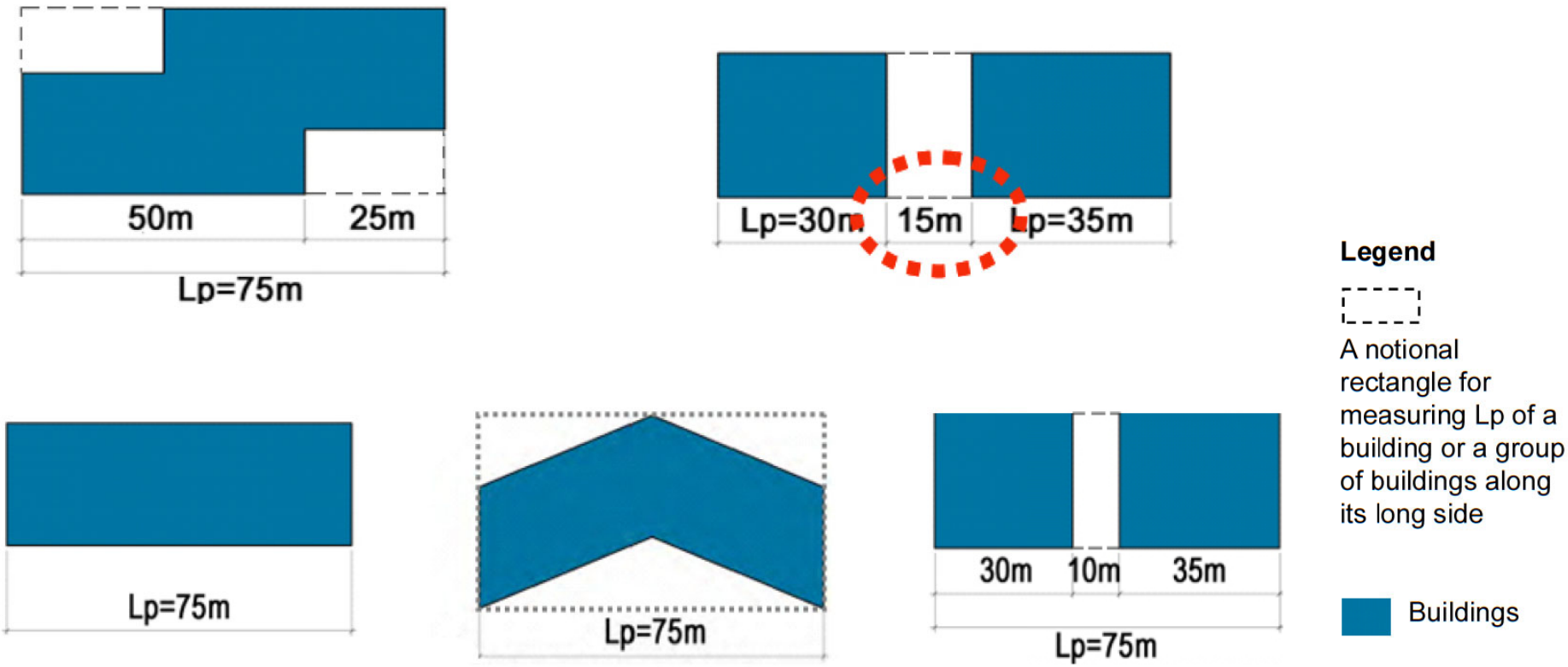


Fig. B1

Lp Examples of determining Lp

- Building portions at low zone of height ≤6.67m (1/3H of low zone) are disregarded in Lp measurement



Diagrammatic Plans of Buildings

Fig. B2

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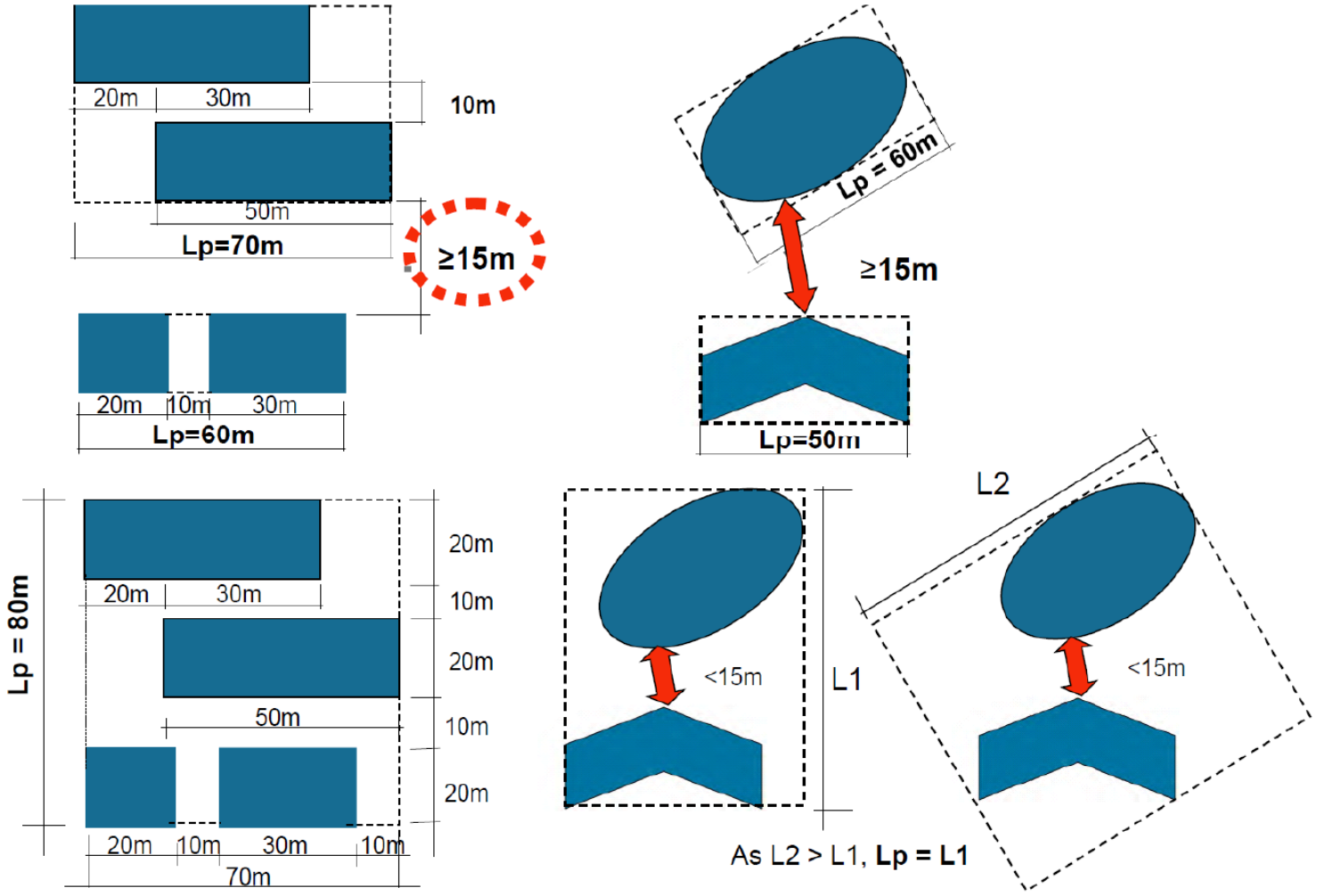
Lp Examples of Lp of a building or group of buildings along its long side



Legend

- A notional rectangle for measuring Lp of a building or a group of buildings along its long side.
- Where the building or a group of buildings is irregular in shape, the notional rectangle may be the smallest rectangle that contains the building or group of buildings.

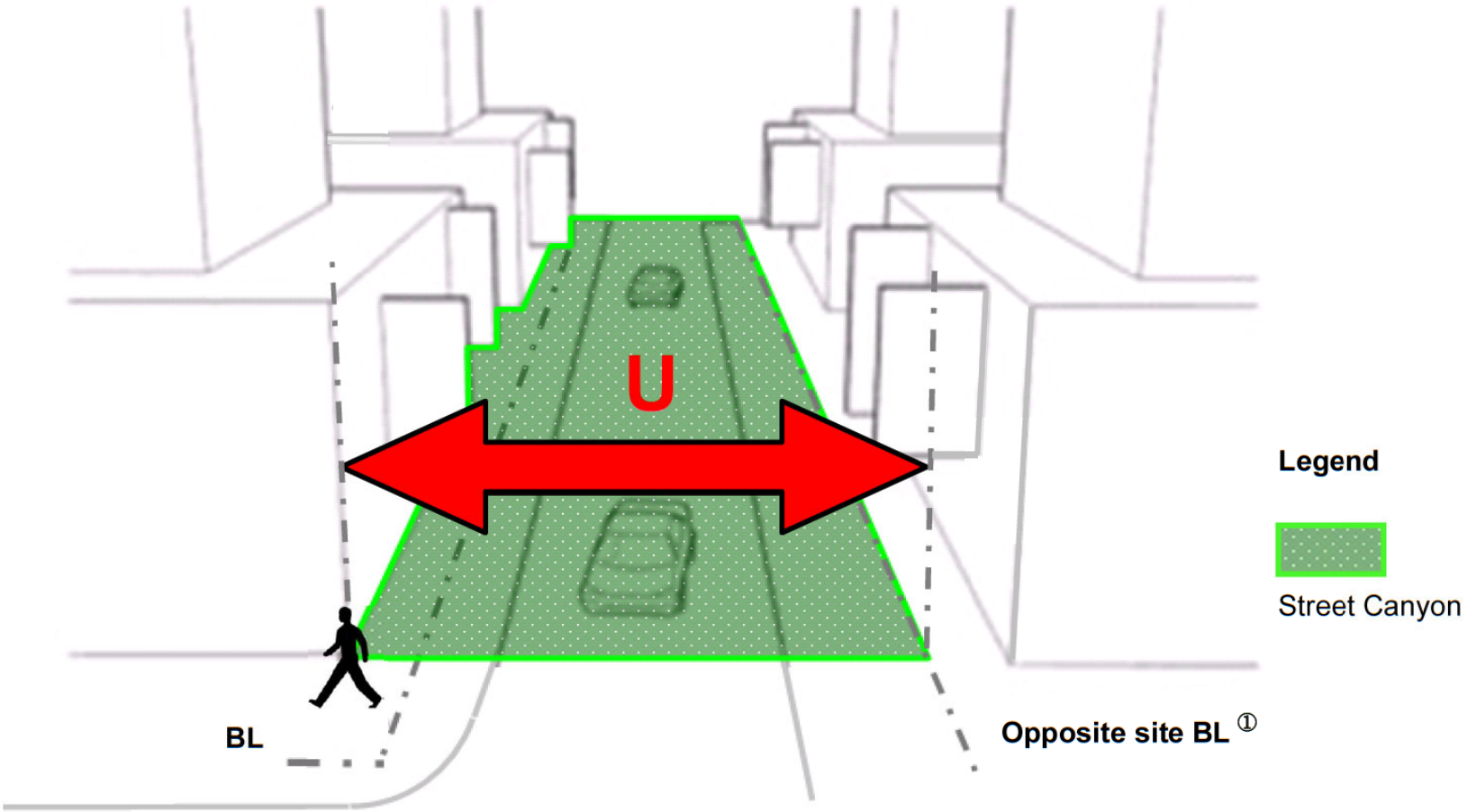
Buildings

Diagrammatic Plans of Buildings

Fig. B3

Showing U

- Street canyon shall be vertically unobstructed. Minor projecting features, such as signboard, a covered footbridge and open sided features (balconies, utility platforms, covered walkways, trellises, etc.) may be disregarded.



Perspective Showing Width of Street Canyon

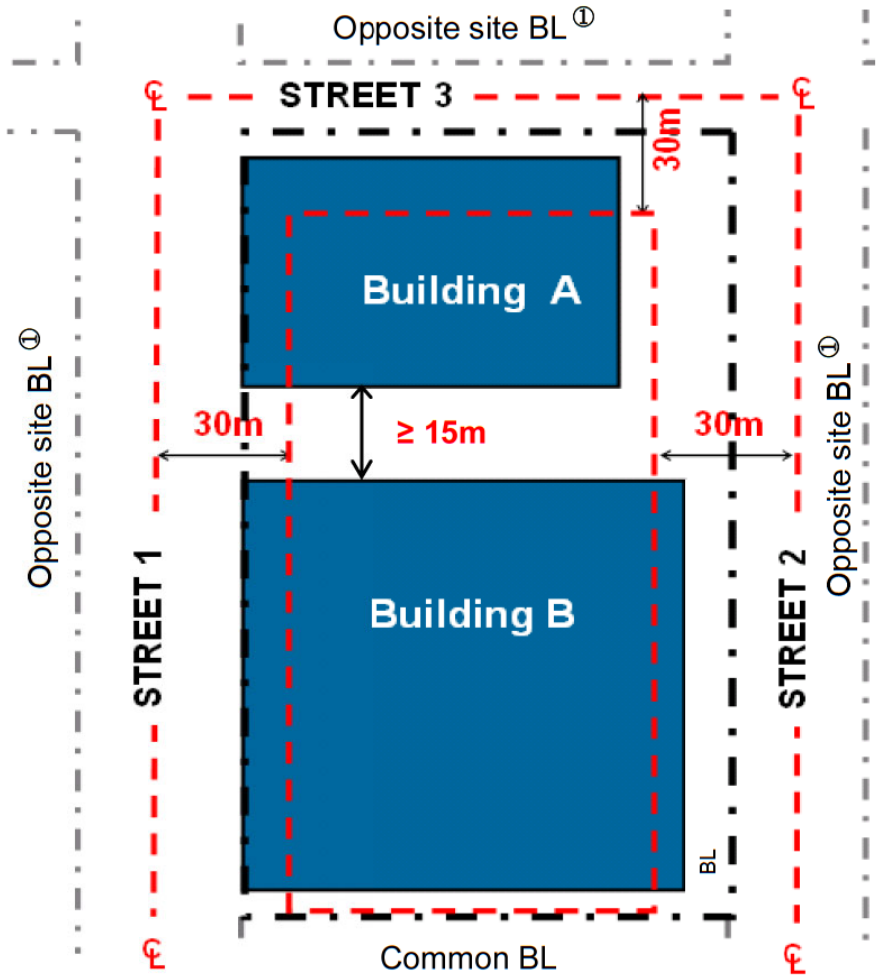
① Opposite side of the street if no opposite site

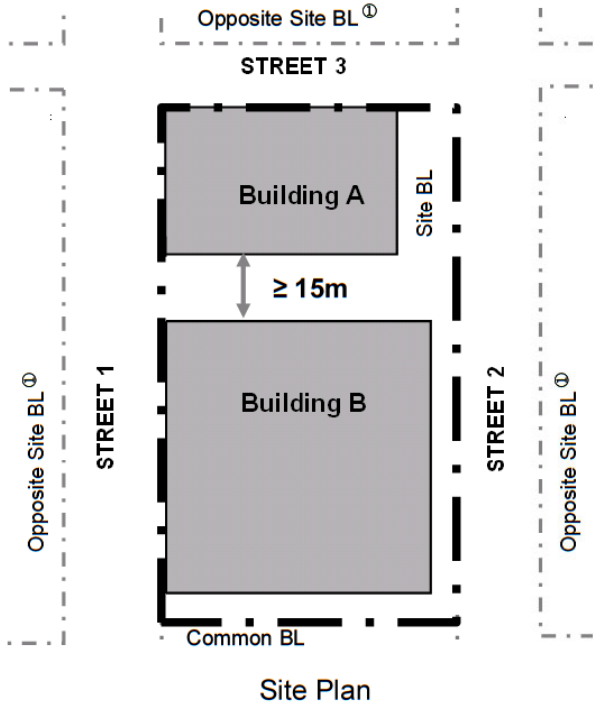
Fig. B4

Adjoining Street Canyons

Buildings subject to control on Lp

- Buildings/groups of buildings wholly or partly **within 30m** from the centreline of an adjoining street.



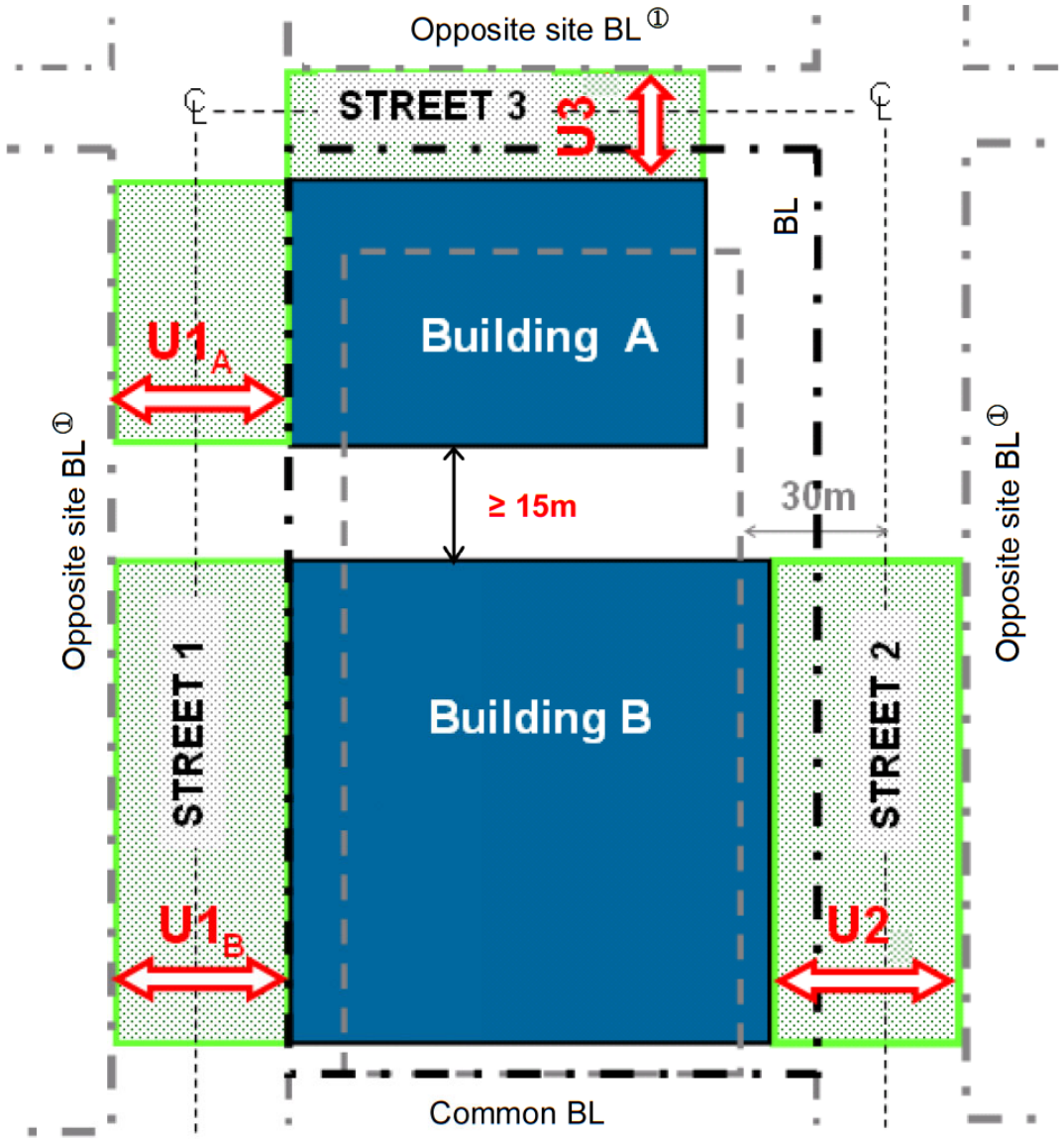


Diagrammatic Plans

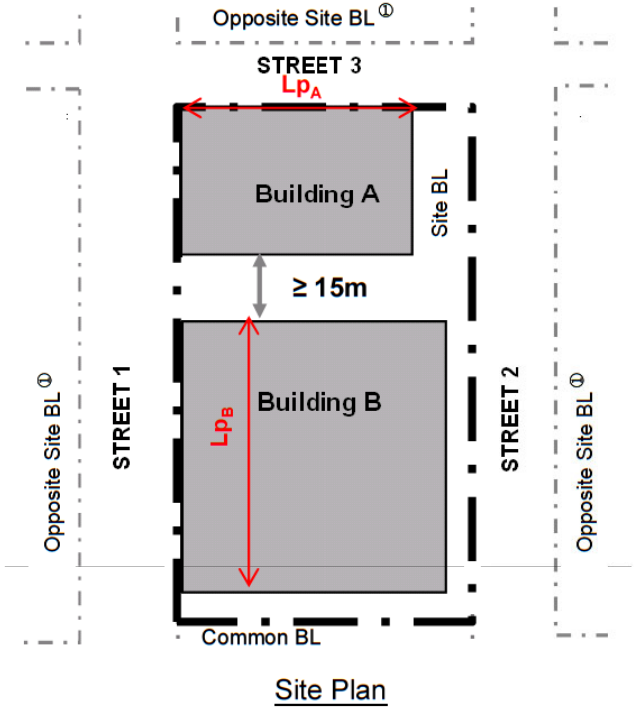
① Opposite side of the street if no opposite site.

Fig. B5

U & Max. Permissible Lp



① Opposite side of the street if no opposite site.



Site Plan

Max. Lp = 5 x U

- If a building abuts two or more streets, use the least U.
- **Building A**

  When $U3 < U1_A$, max. $Lp_A = 5 \times U3$
- **Building B**

  When $U1_B < U2$, max $Lp_B = 5 \times U1_B$

Fig. B6

Diagrammatic Plans

U & Max. Permissible Lp

Building A

- When width of the adjoining street canyon varies, Lp is determined by the smallest U.
- When $U_{A1} < U_{A2}$, max. $Lp_A = 5 \times U_{A1}$

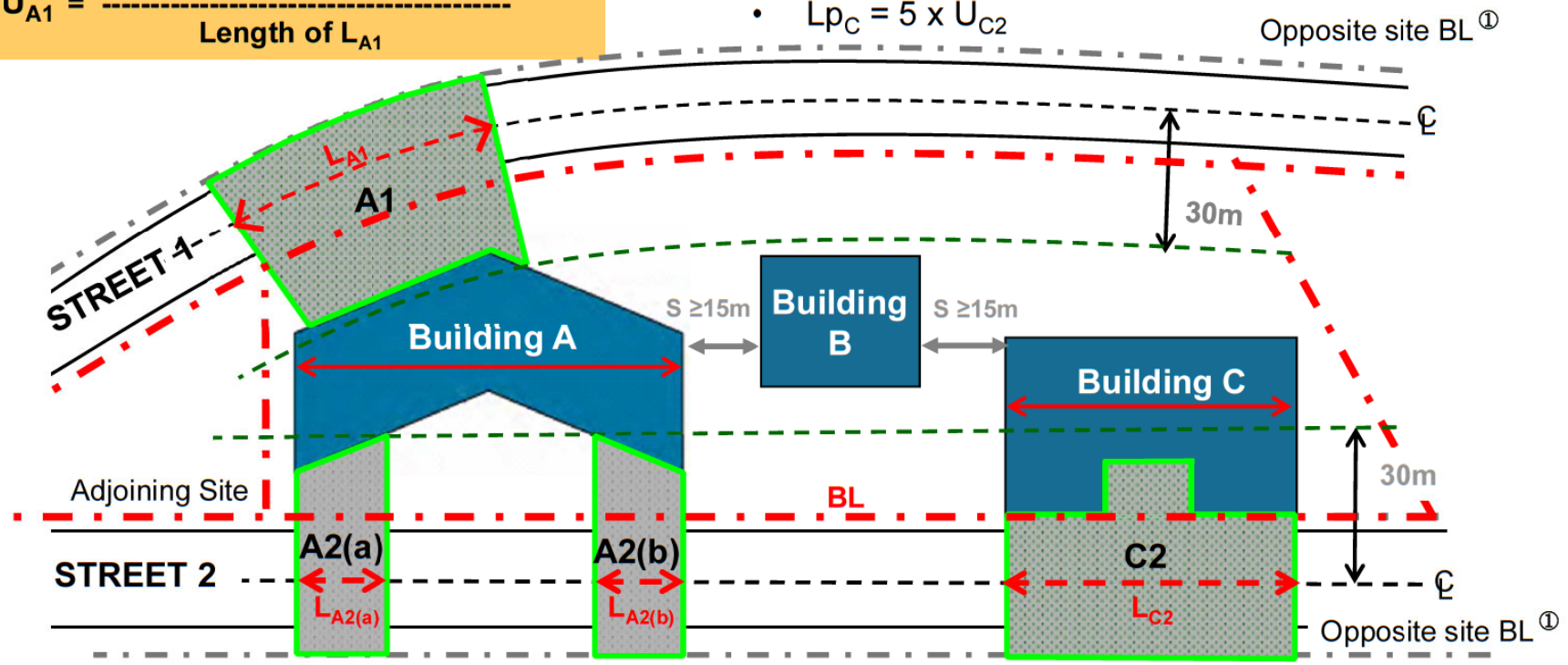
$$U_{A1} = \frac{\text{A1 (area of street canyon)}}{\text{Length of } L_{A1}}$$

Building B

- No part of the building is closer than 30m to the street centrelines. Building B is not subject to Design Requirement (1).

Building C

- Lp is determined by the U at Street 2:
- $Lp_C = 5 \times U_{C2}$



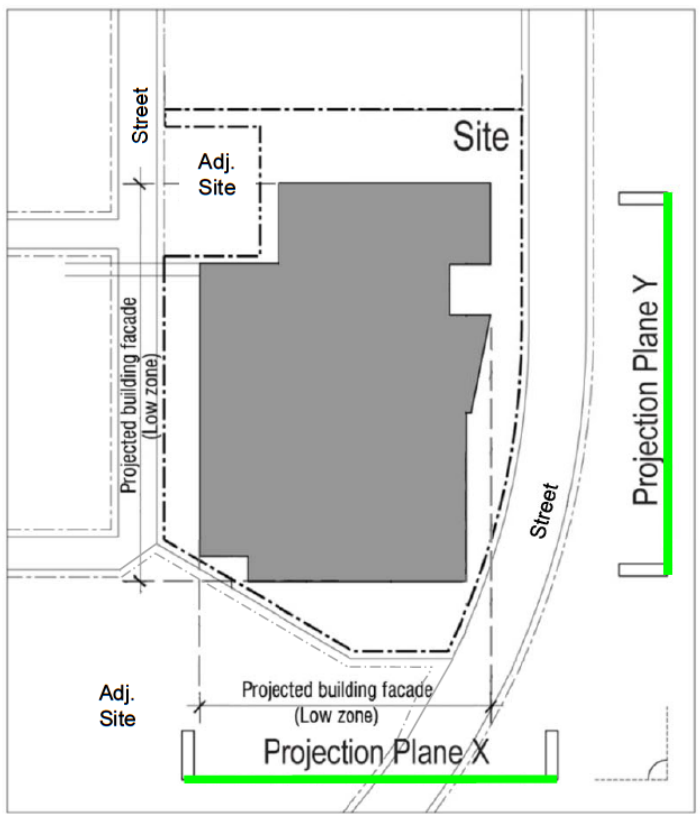
$$U_{A2} = \frac{\text{A2(a) + A2(b) (total areas of street canyon)}}{\text{Length of } L_{A2(a)} \text{ \& } L_{A2(b)}}$$

$$U_{C2} = \frac{\text{C2 (area of street canyon)}}{\text{Length of } L_{C2}}$$

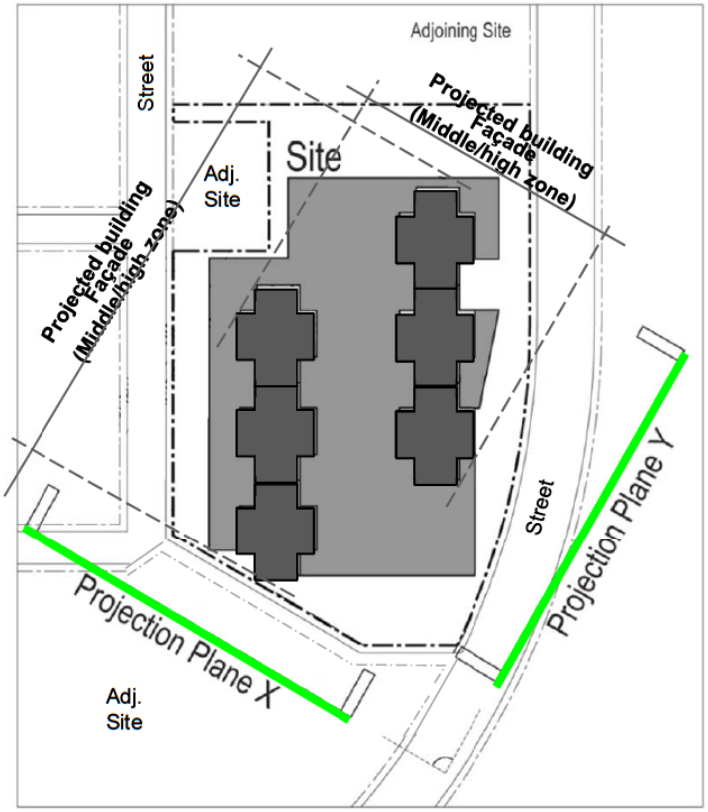
① Opposite side of the street if no opposite site.

Diagrammatic Plan Fig. B7

Pair of Projection Planes for Assessment of P



Low Zone (Plan)



Middle/Upper Zone (Plan)

Low Zone

- One of the planes ① parallel to an adjoining street

Middle/High Zone

- Any pair of chosen planes ① to suit the building disposition or environmental context e.g. prevailing wind direction

P assessment on one plane only if:

- Site < 2ha and Lp > 60m on <u>one</u> projection plane only.

① The angle between each pair of projection planes is **75-105°**.

Fig. B8

Assessment of P

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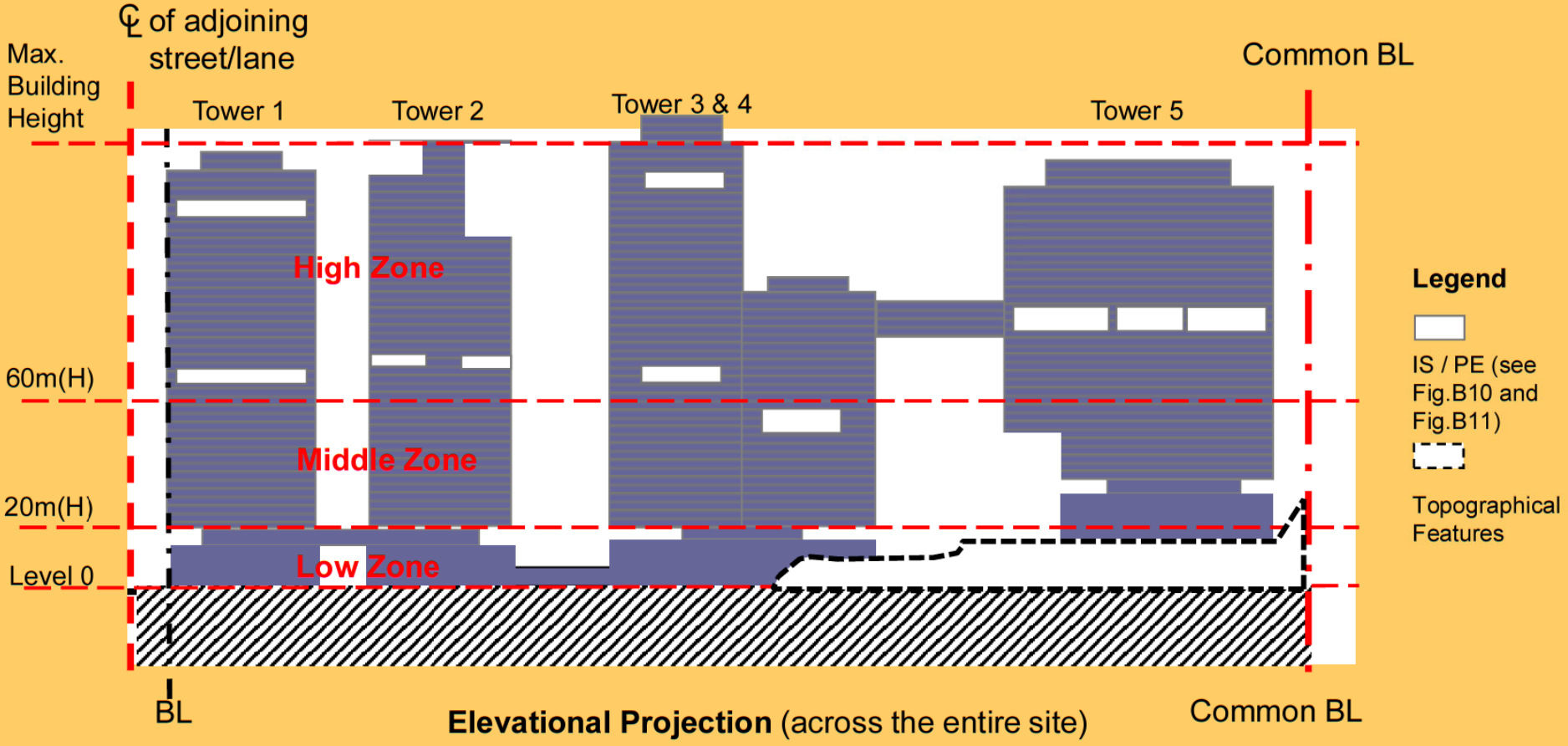
$$P = \frac{\text{Sum of areas of IS and PE}}{\text{Area of the assessment zone}} \times 100\%$$



Elevational Projection (across the entire site)

Fig. B9

IS & PE

Appendix B
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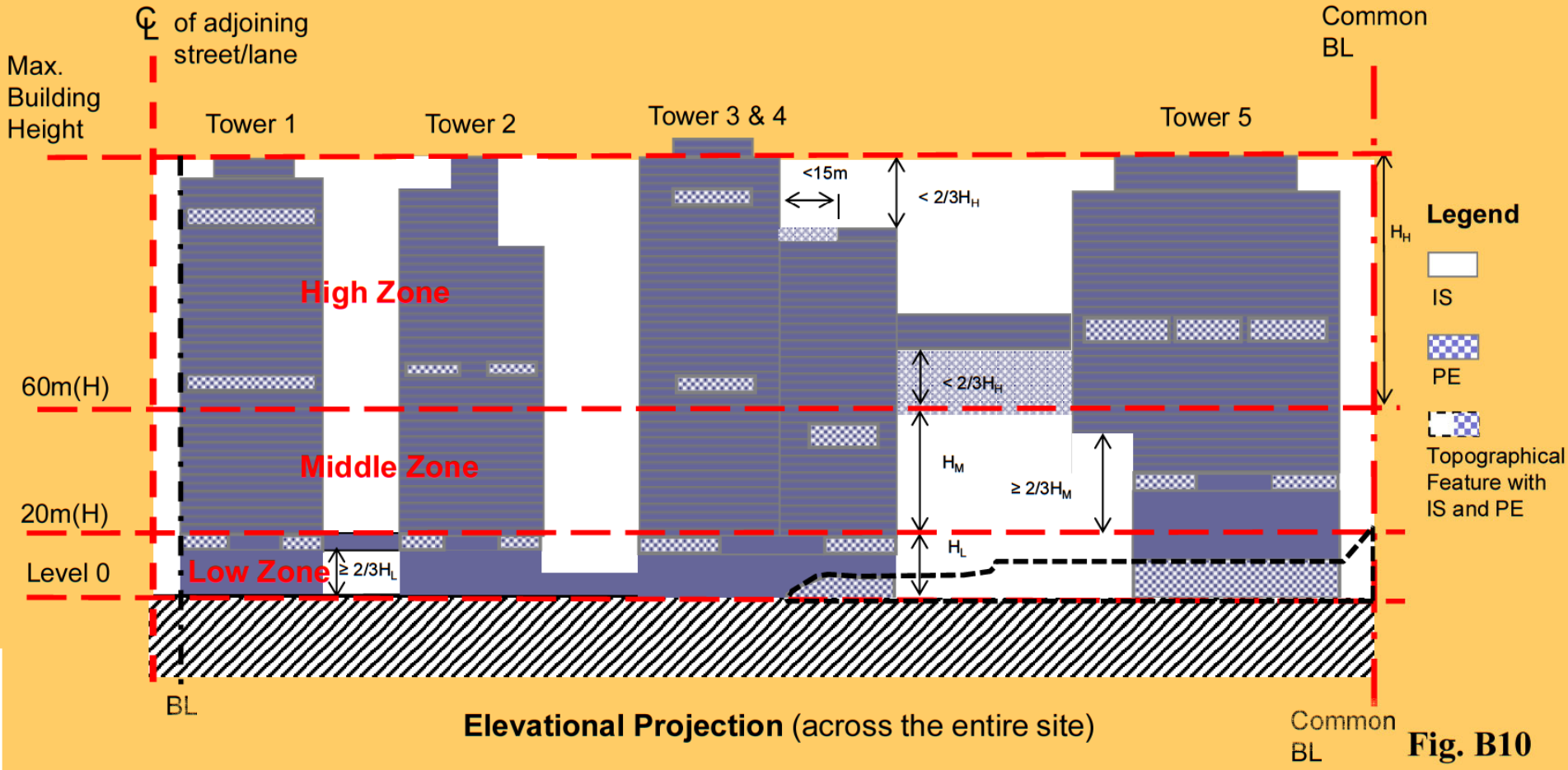
IS shall account for min. 2/3 of the required P

$$\frac{\text{Sum of areas of IS}}{\text{Area of the assessment zone}} \times 100\% \geq 2/3\ P$$

PE may contribute to maximum 1/3 of the required P

$$\frac{\text{Sum of areas of PE}}{\text{Area of the assessment zone}} \times 100\% \leq 1/3\ P$$

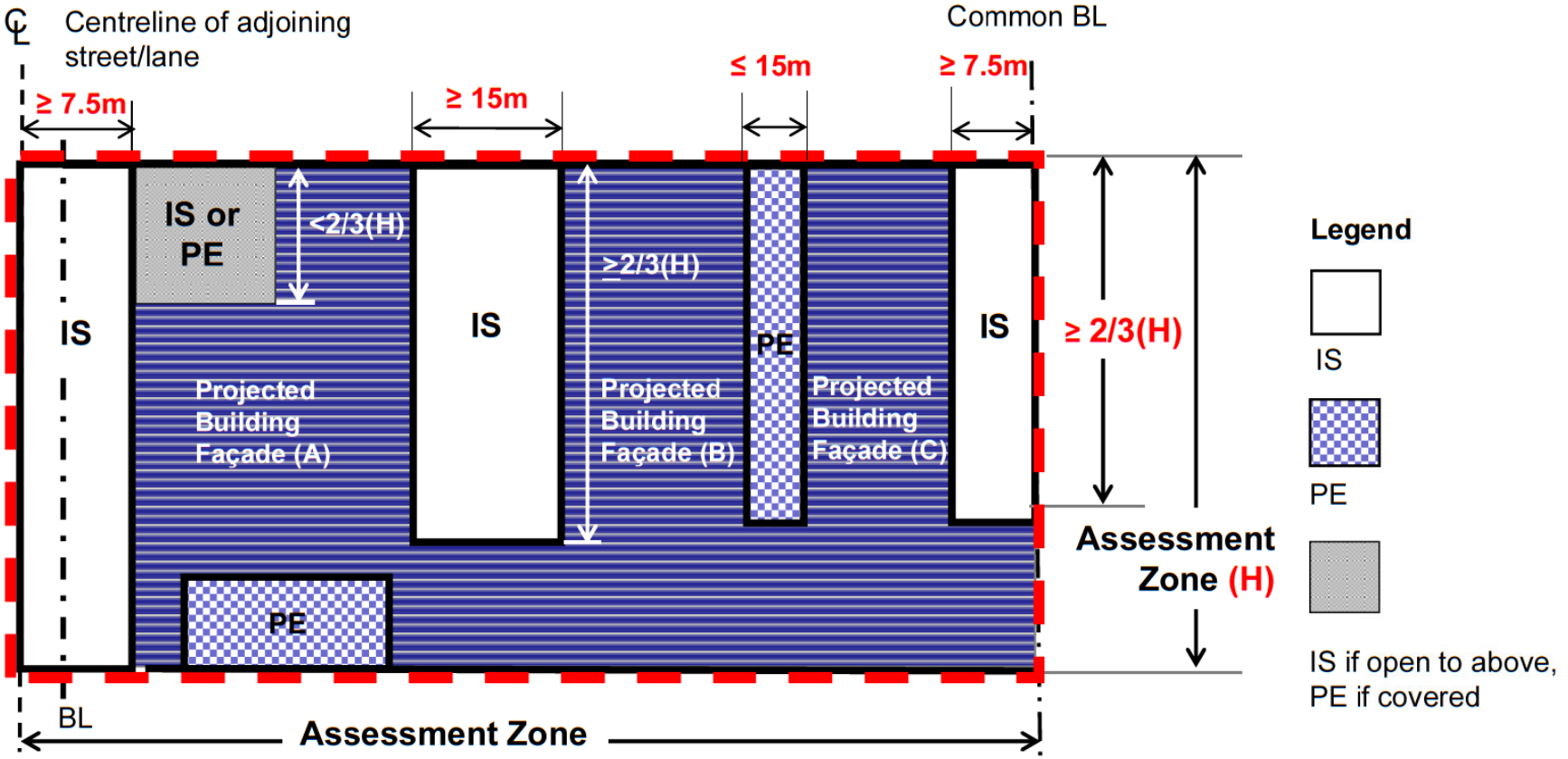


Elevational Projection (across the entire site)

Fig. B10

IS and PE

- IS shall be provided between end of a projected façade and adjacent common BL / centreline of adjoining street/lane and has a width or mean width ≥ 7.5m (see Fig.B12, Fig.B14, Fig.B15 and Fig.B16).
- Additional IS between end of projected façades shall be ≥ 15m.
- Height of IS shall be ≥ 2/3H of the Assessment Zone or open to above.
- PE shall have clear width and clear height ≥ 3m.



Elevational Projection (across the entire site)

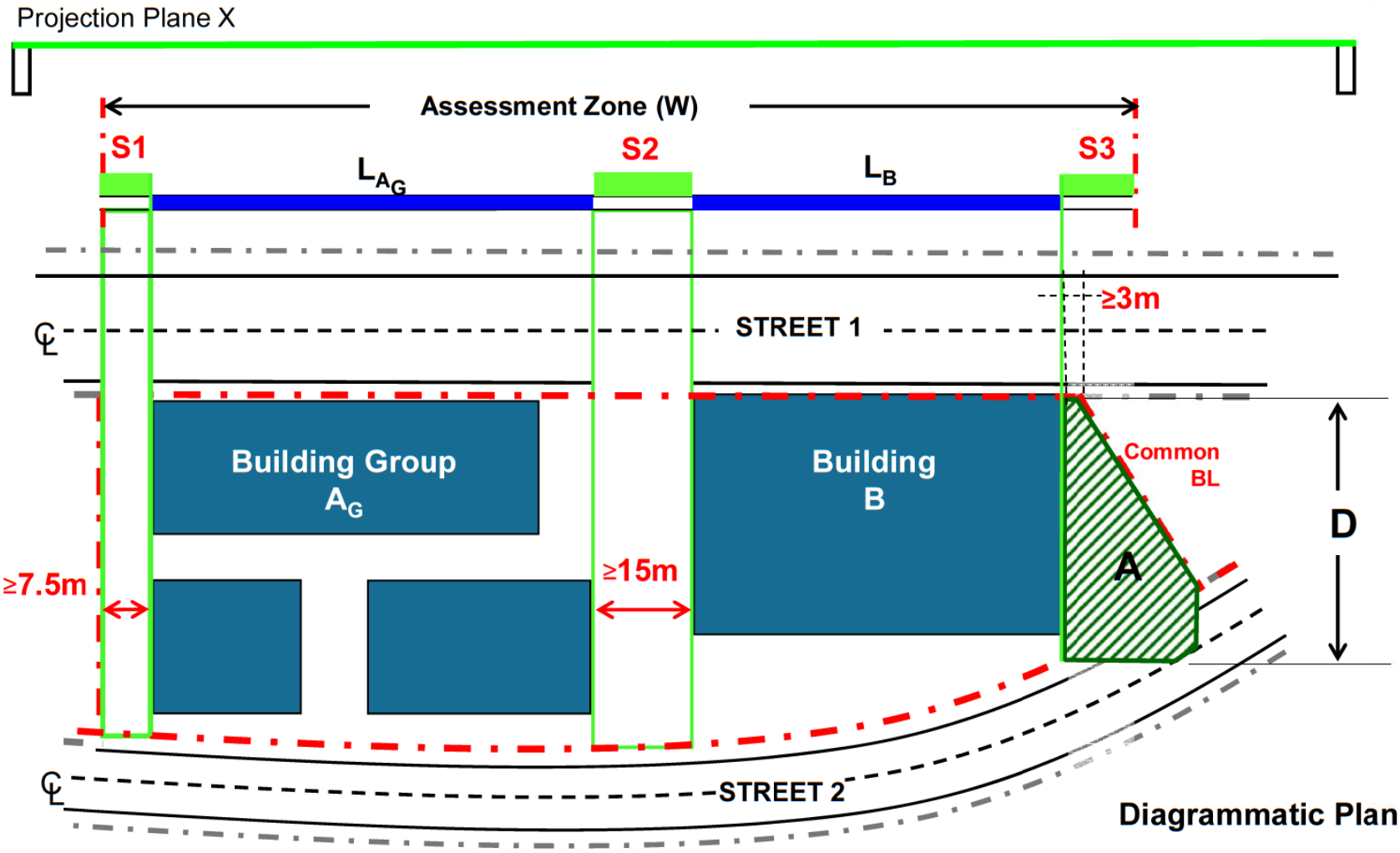
Fig. B11

Assessment of S

S1 ≥ 7.5m

S2 ≥ 15m

$$S3^{①} = \frac{\text{Area (A)}}{\text{Depth (D)}} \ (\geq 7.5\text{m})$$



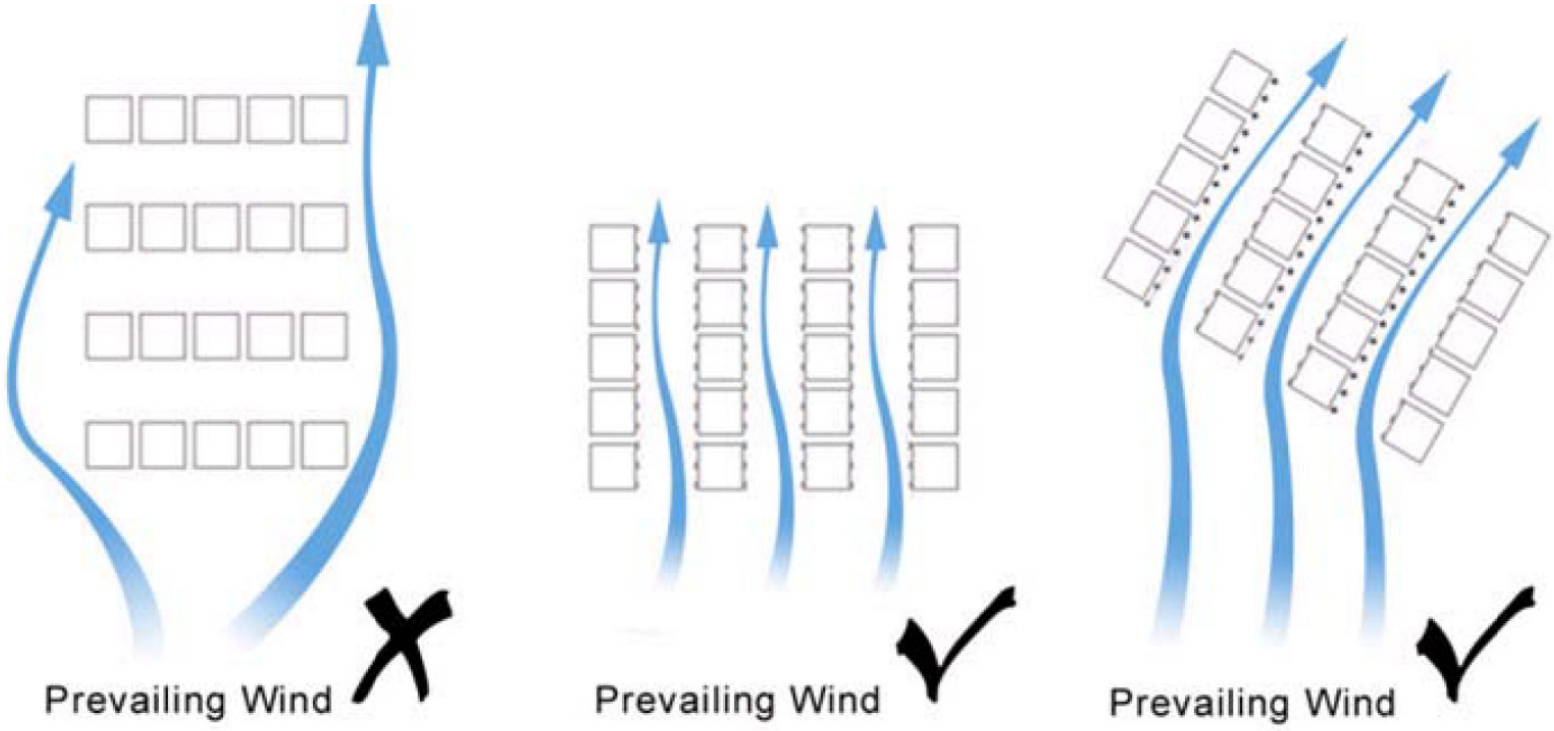
① No part of the building within 3m from the BL.

Fig. B12

Notional Air Corridor

Provided that the minimum required width of the IS / notional air corridor is maintained,

- Change in direction is permissible **≤ 15°** when it meets the BL or anywhere within the site, and
- Overall direction deviate **≤ 15°** from the original path



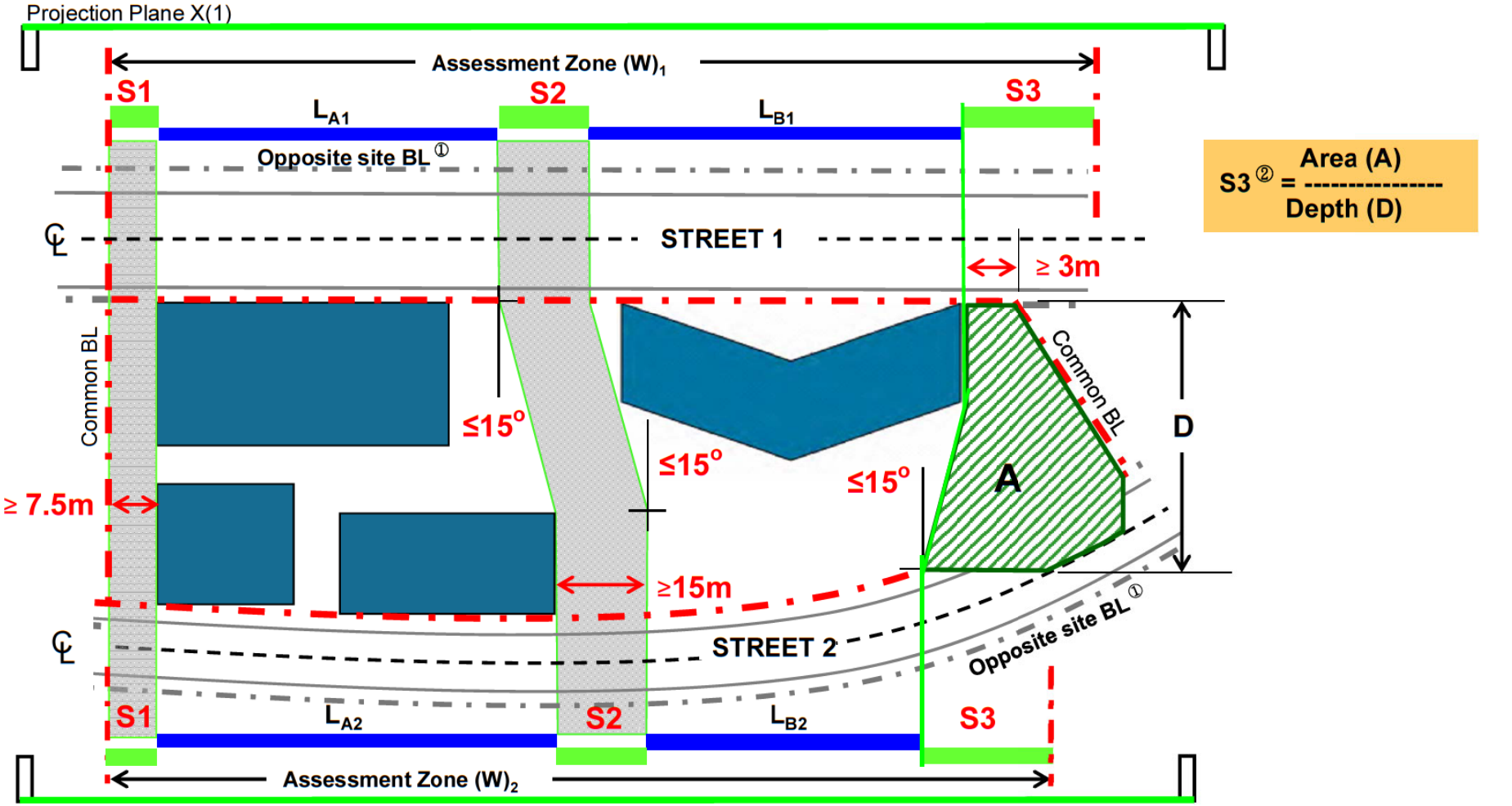
Diagrammatic Plan

Fig. B13

Notional Air Corridor S between buildings & at façade ends

Appendix B
(PNAP APP-152)

- When projection plane X is placed on either side of the site, length of a building façade so projected on the planes may vary.
- Assessment of P may be based on the projection on either Plane X(1) or X(2).
- S1 & S3 ② **≥7.5m.**
- S2 **≥15m**



$$S3\ ② = \frac{\text{Area (A)}}{\text{Depth (D)}}$$

① Opposite side of the street if no opposite site.
② No part of the building within 3m from the BL.

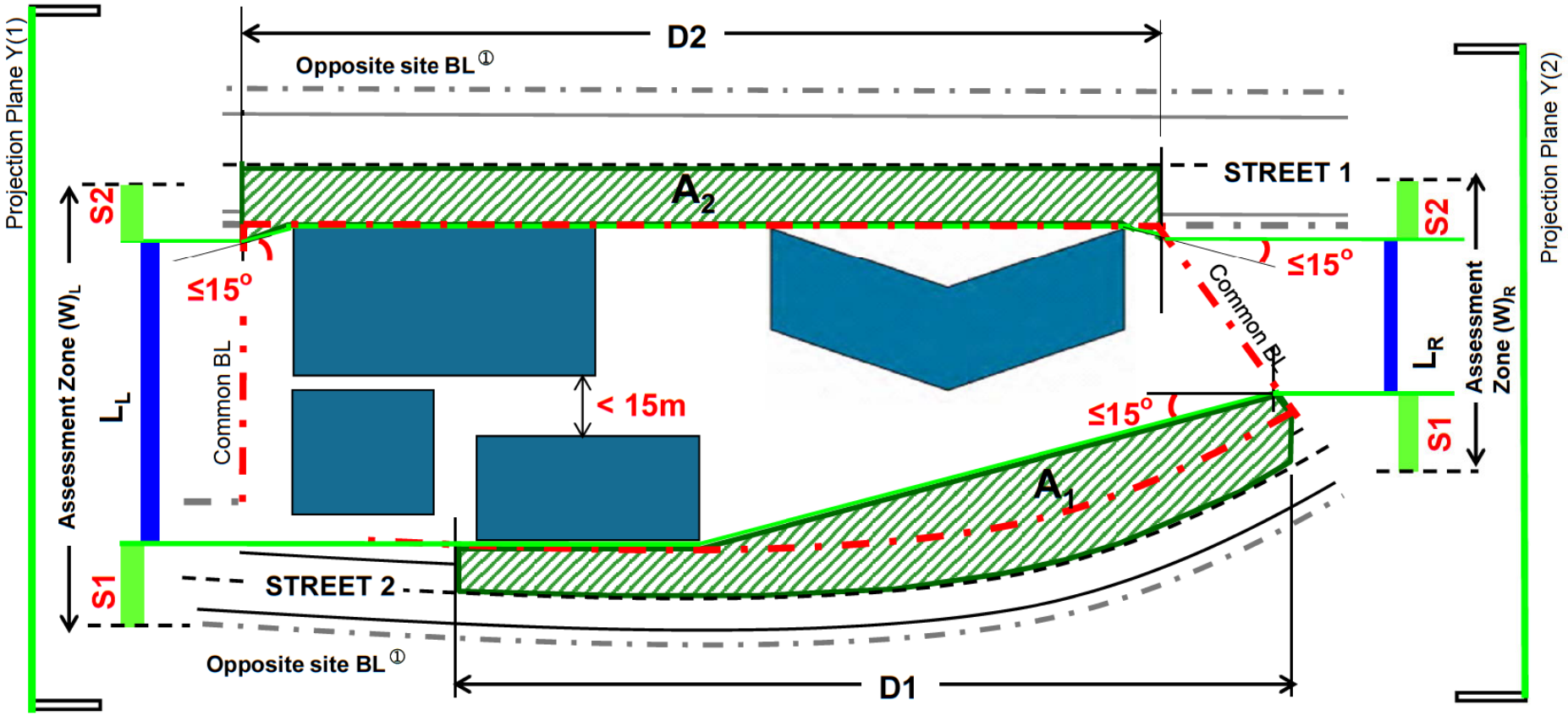
Diagrammatic Plan

Fig. B14

Notional Air Corridor S at façade ends

- When projection plane Y is placed on either side of the site, length of a building façade so projected on the planes may vary.
- Assessment of P may be based on the projection on either Y(1) or Y(2) as chosen.
- S1 & S2 between adjoining street/lane **≥7.5m**

$$S = \frac{\text{Area (A)}}{\text{Depth (D)}} \quad (\geq 7.5\text{m})$$

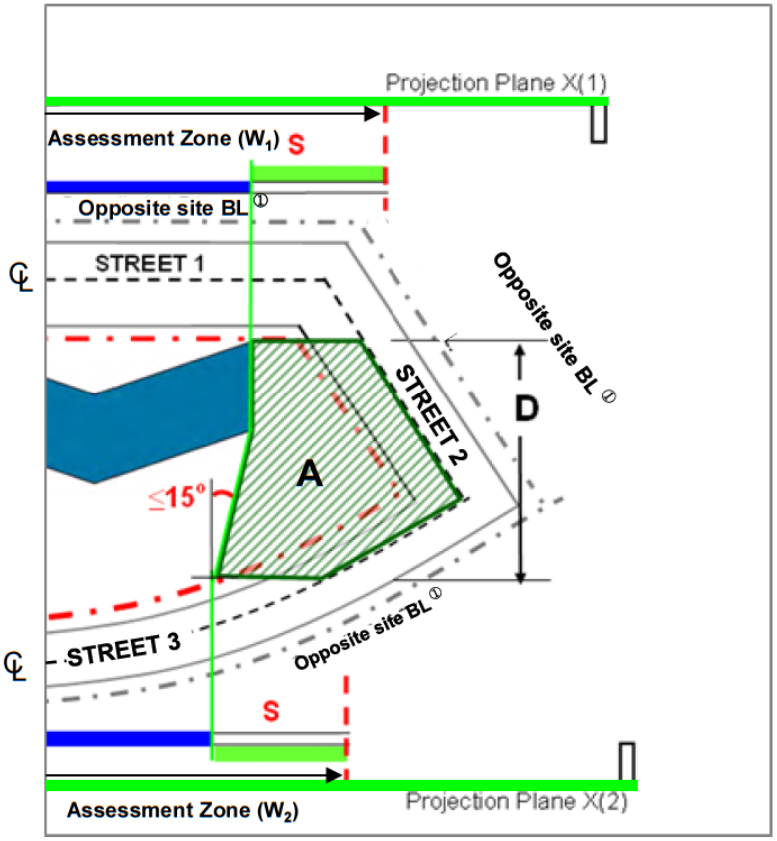


① Opposite side of the street if no opposite site.

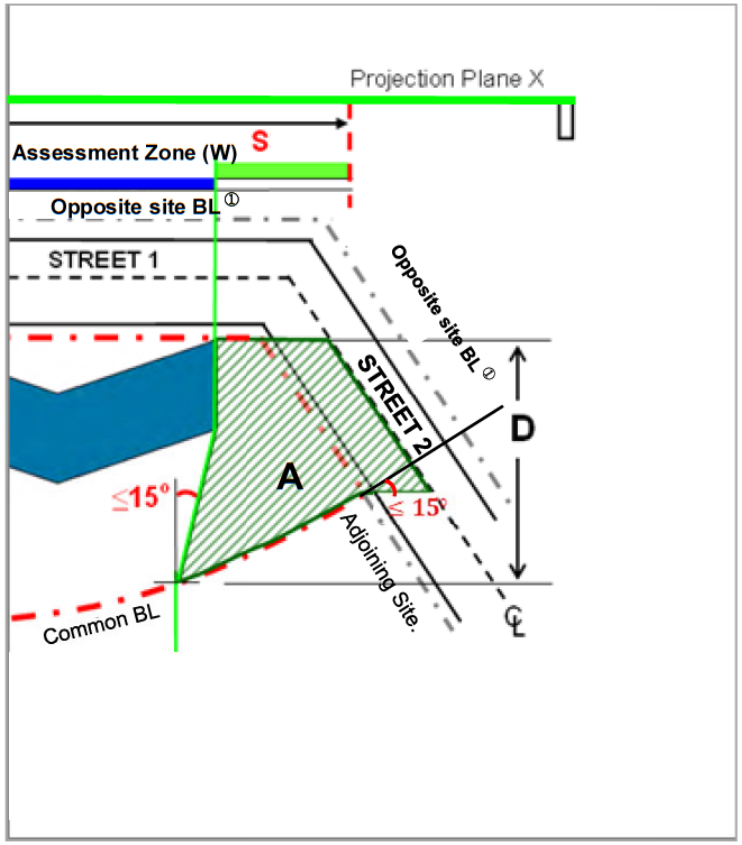
Diagrammatic Plan **Fig. B15**

Notional Air Corridor S at façade ends

$$S^{②} = \frac{\text{Area (A)}}{\text{Depth (D)}} \quad (\geq 7.5\text{m})$$



- When the site abuts three adjoining streets



- When the site abuts two adjoining streets

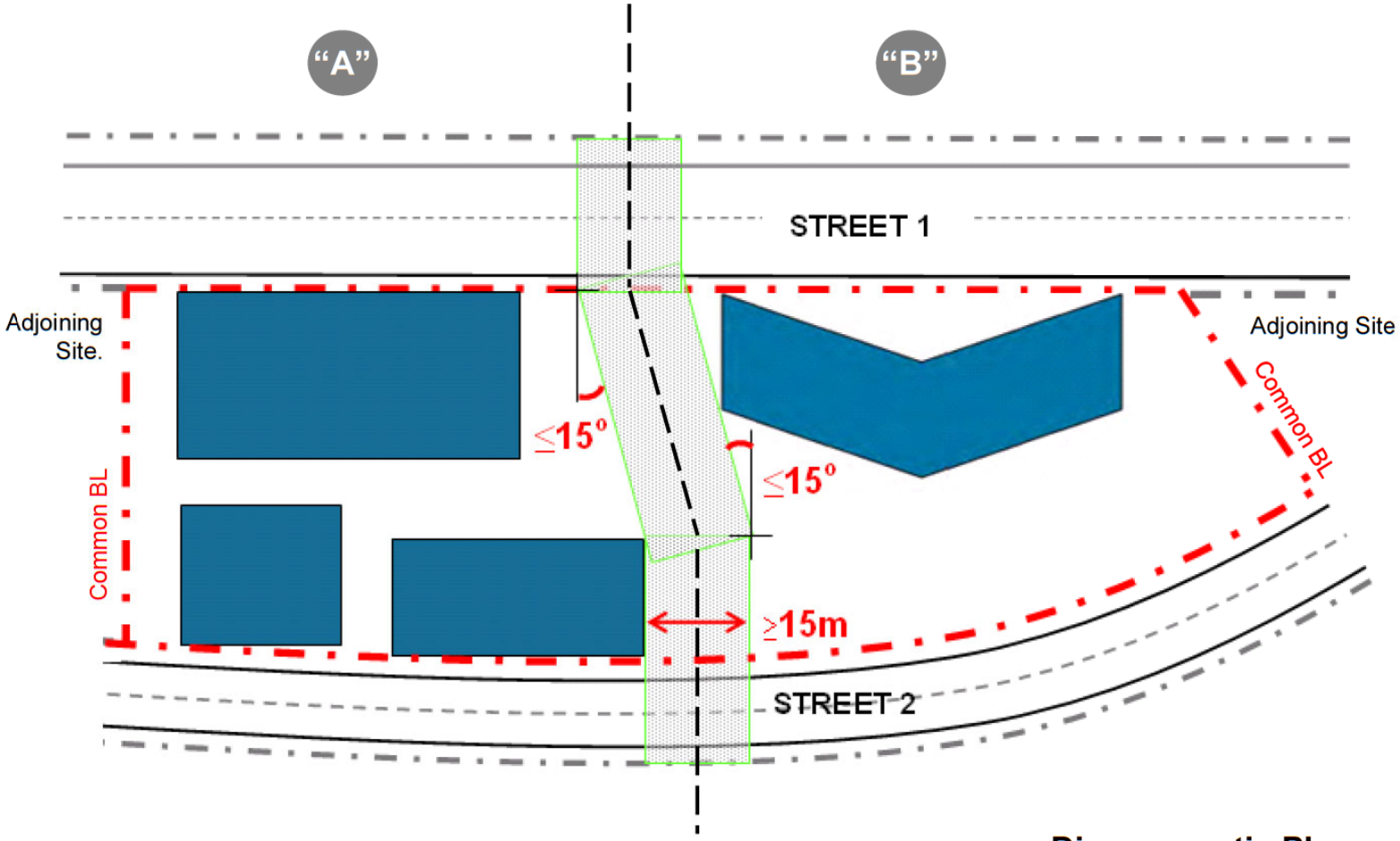
① Opposite side of the street if no opposite site.
② No part of the building within 3m from the BL.

Diagrammatic Plans **Fig. B16**

Wind Path passing through the site

Dividing the site into TWO or more notional sites for assessment of P

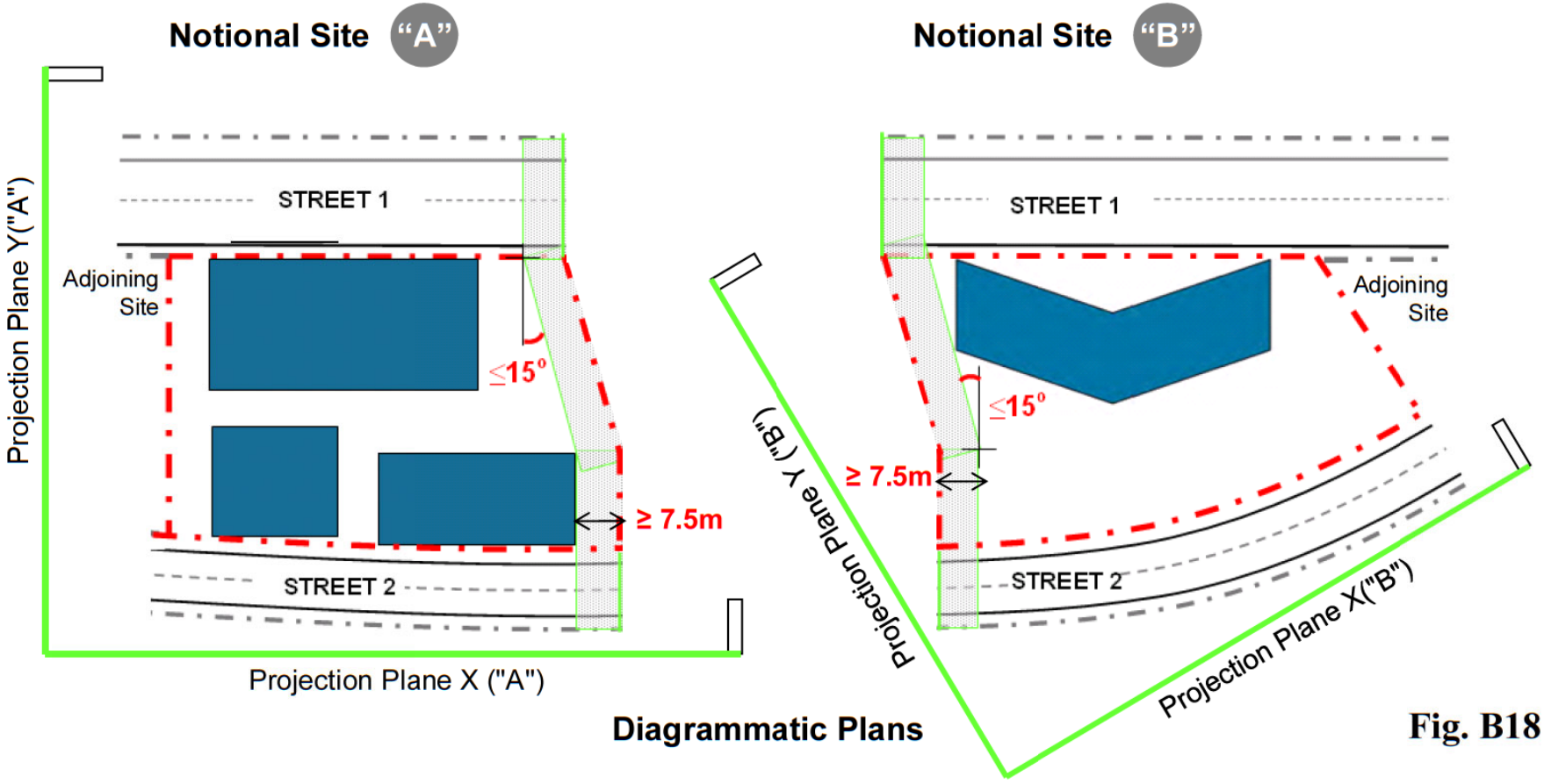
- vertically uncovered and unobstructed above the lowest level of the assessment zone
- width **≥ 15m**
- leading to a street or lane of mean width **≥ 7.5m** at both ends



Diagrammatic Plan **Fig. B17**

Sub-divided Notional Sites for Assessment of P

- S at the projected facade end shall be measured to the notional BL at centreline of the wind path.
- Individual pair of projection planes may be chosen for each of the TWO sub-divided sites for P assessment.
- "Level Zero" of the original undivided site shall be used for all notional sites.



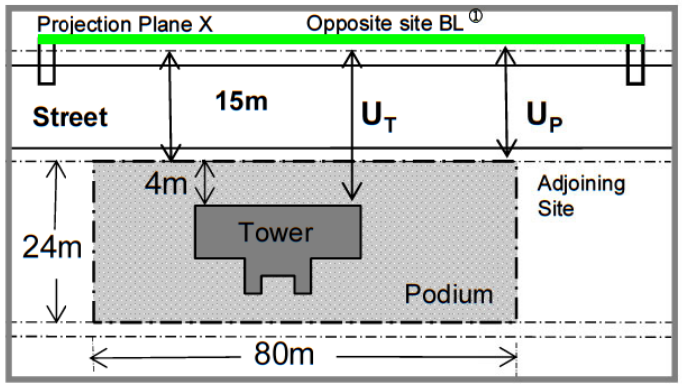
Diagrammatic Plans

Fig. B18

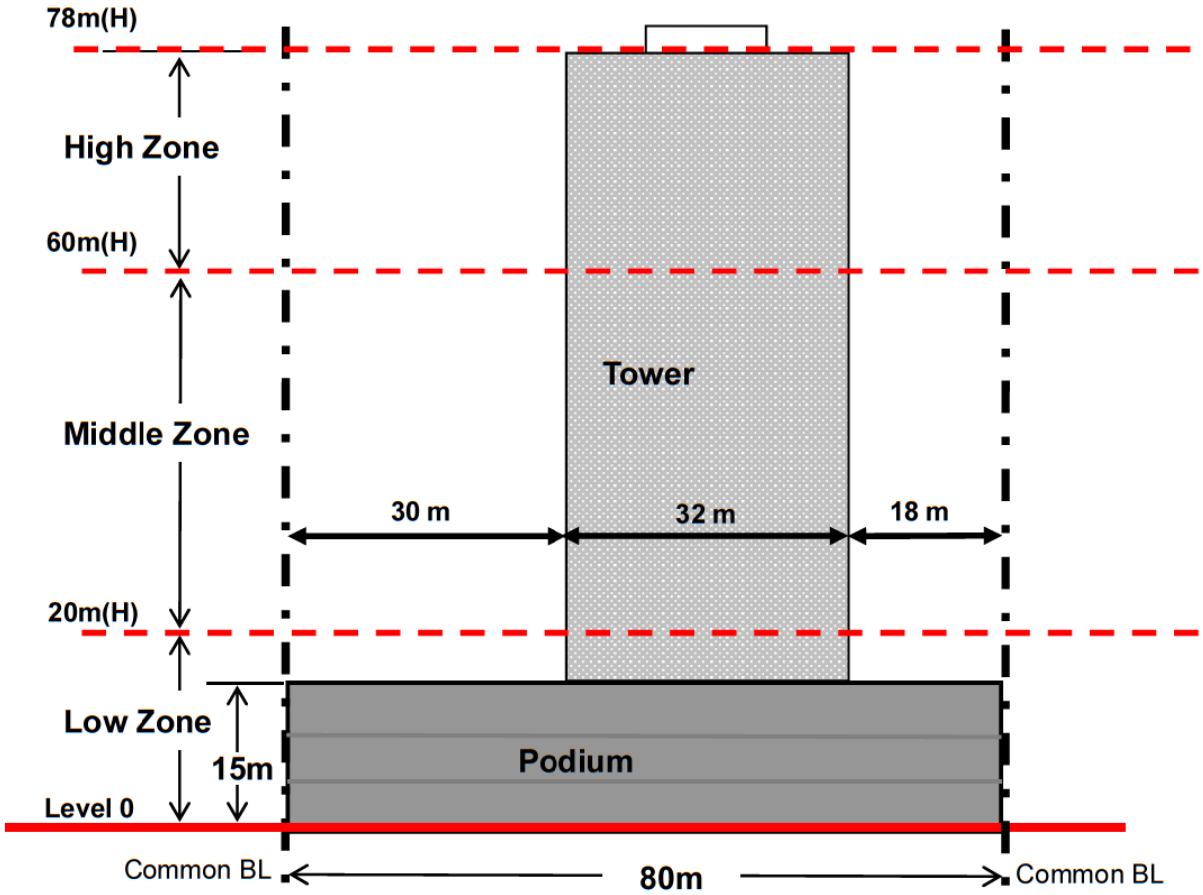
Building Separation Assessment

Sample Case

- Site area =1,920m² (< 20,000 m²)
- Proposed building: one tower above a podium of 15m(H)
- Max. building height = 78m (> 60m)
- The site abuts a street of 15m wide
- Lp of podium with full site coverage = 80m(>60m, *assessment required*)



Plan



Projected Facade Through Projection Plane X

Elevational Projection

Design Requirement (1)
Max. Lp = 5 x U

Building at Low Zone

- U_P = 15m, max. L_P = U_P x 5 = 75m
- Lp of proposed podium = 80 m (> 75m)
  (*i.e. NOT OK*)

Building at Middle Zone

- U_T = 19m, max. L_T = U_T x 5 = 95m
- Lp of proposed tower = 32m (< 95m)
  (*i.e. OK*)

Building at High Zone

- U_T = 19m, max. L_T = U_T x 5 = 95m
- Lp of proposed tower = 32m (< 95m)
  (*i.e. OK*)

① Opposite side of the street if no opposite site

Fig. B19

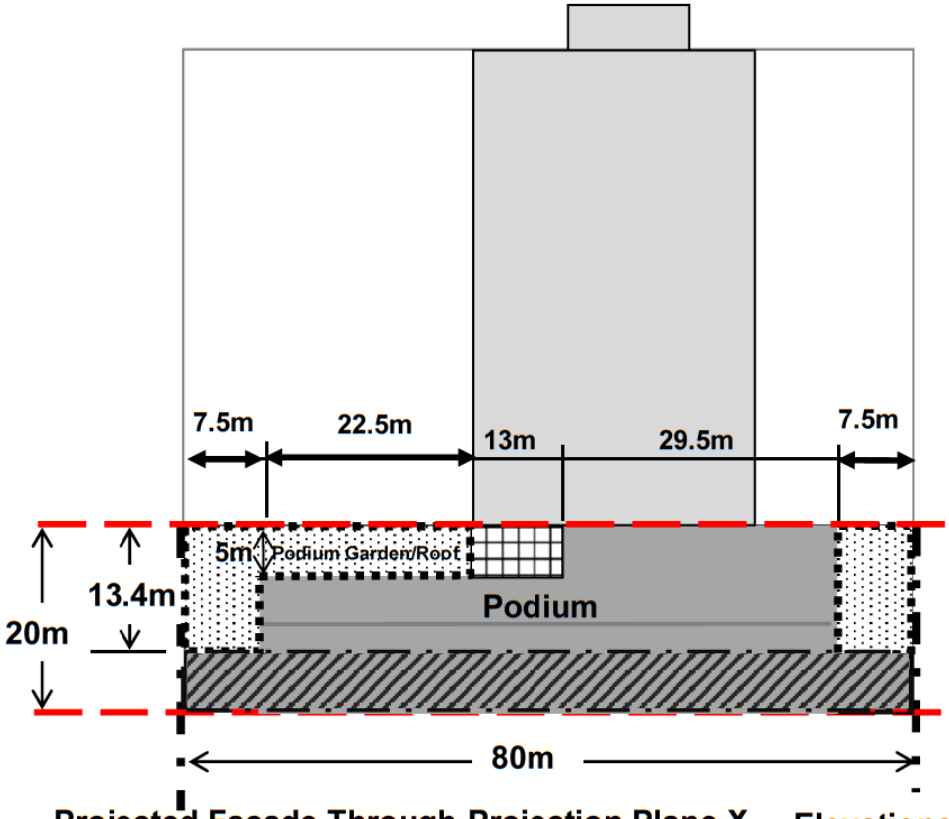
Building Separation Assessment

Design Requirement (1) - Low Zone

- U_P = 15m, max. L_P = U_P x 5 = 75m
- Lp = 80m – 7.5m x 2 = 65m < 75m

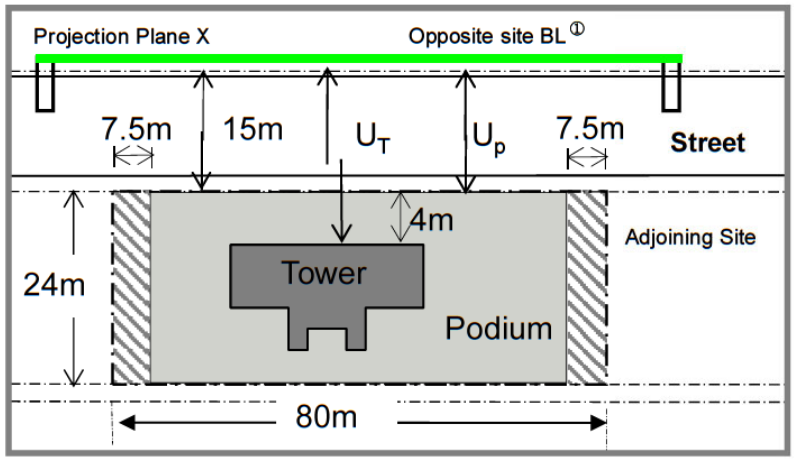
Design Requirement (2) - Low Zone

- Minimum P = 20% (from Table 2)
- Set Projection Plane X parallel to a Street



Projected Facade Through Projection Plane X

Elevational Projection



Plan

IS & S
- min. 7.5m to common B.L.
- height ≥ 2/3 of the Assessment Zone **or** open to above

Total facade area of the IS
= (7.5x13.4)m² + (7.5x13.4 + 22.5x5)m² = 313.5m²

P achieved by the IS
= 313.5m² / (20x80)m² x 100%
= 19% (< 20%, but not less than (2/3) x 20% = 13.33%)

Facade area of the PE
= 13m x 5m = 65m²

P achieved by the PE
= 65m² / (20x80)m² x 100%
= 4% (< (1/3) x 20% = 6.66%, *i.e. all accountable*)

Overall P achieved at low zone
= 19% +4% = 23% (> 20%, *i.e. OK*)

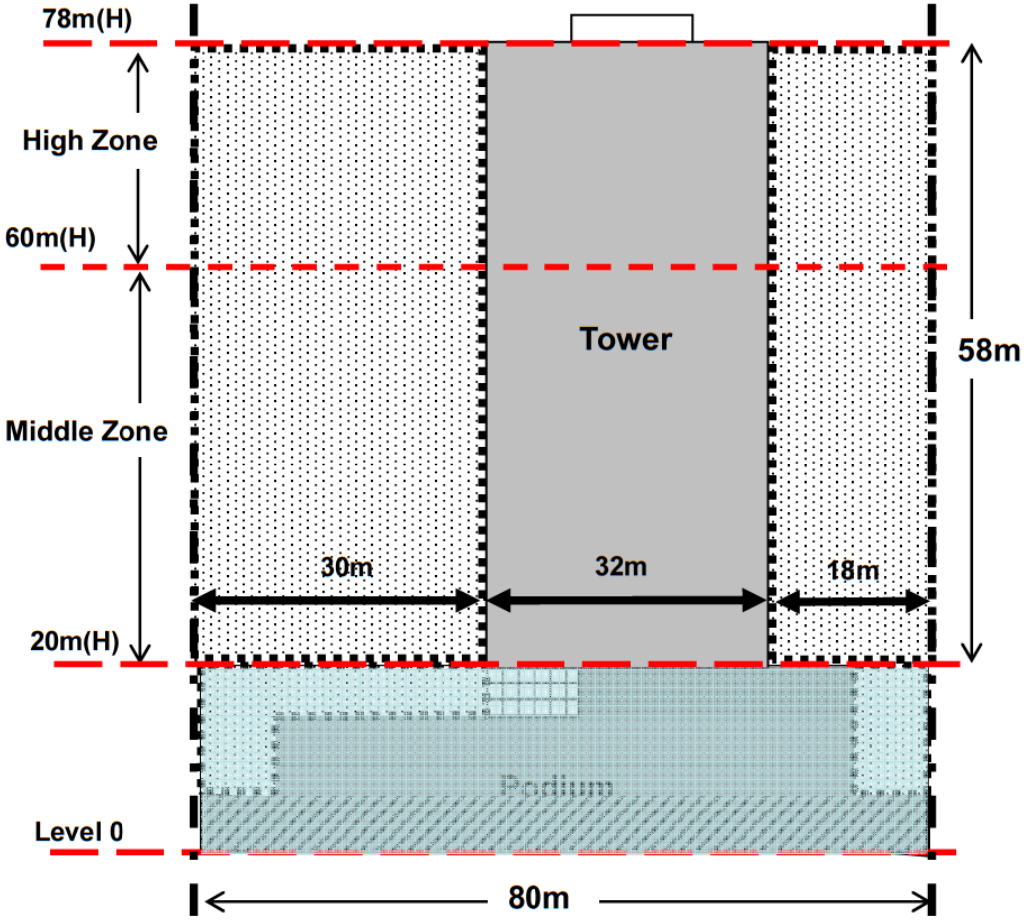
IS PE Low zone portion ≤1/3H are disregarded in Lp measurement

① Opposite side of the street if no opposite site

Fig. B20

Building Separation Assessment

Design Requirement (2) - Middle and High Zone



Projected Facade Through Projection Plane X

Elevational Projection

IS

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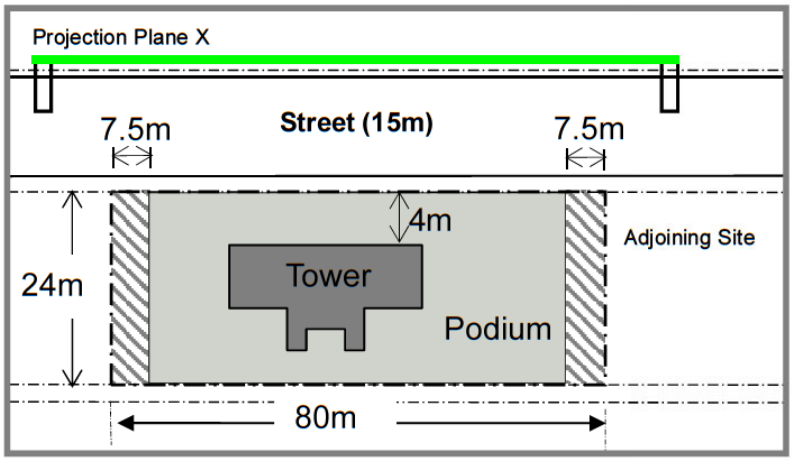


Plan

IS & S for middle & high zone

- min. 7.5m to common BL
- height ≥ 2/3 of the Assessment Zone **or** open to above

Middle zone:

Total facade area of the IS

= (18x40)m^2 + (30x40)m^2 = 1920m^2

P achieved by IS

= 1920m^2 / (80x40)m^2 x 100%

= 60% (> 20%, *i.e. OK*)

High zone:

Total facade area of the IS

= (18x18)m^2 + (30x18)m^2 = 864m^2

P achieved by IS

= 864m^2 / (80x18)m^2 x 100%

= 60% (> 20%, *i.e. OK*)

Fig. B21

Appendix C
(PNAP APP-152)

Building Setback Requirements

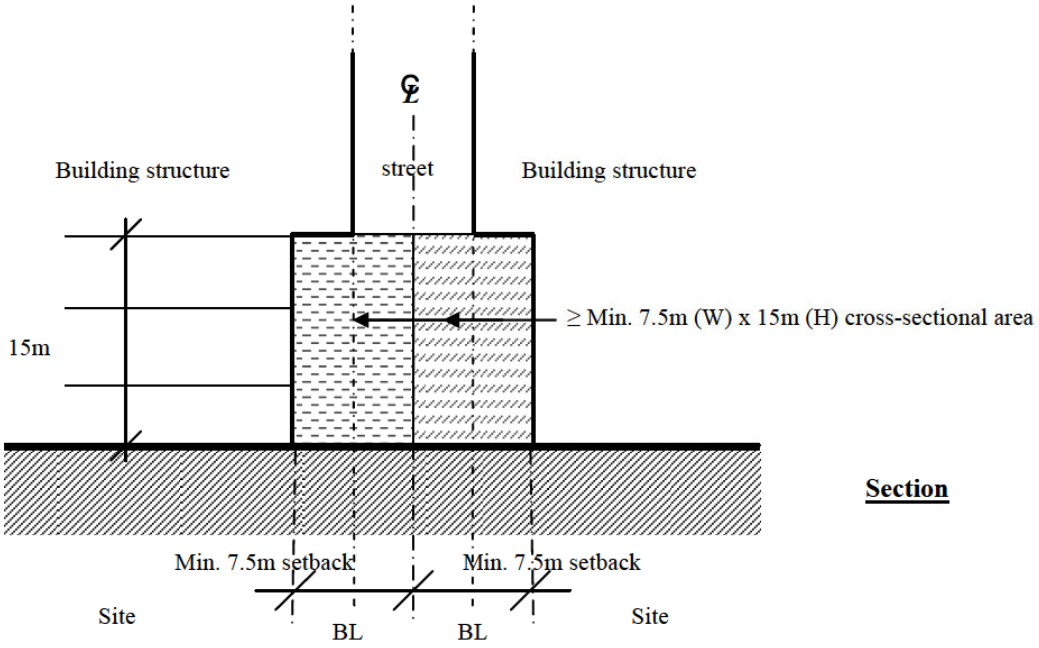


Fig. C1 Building setback as detailed in paragraph 7(a) of this PNAP

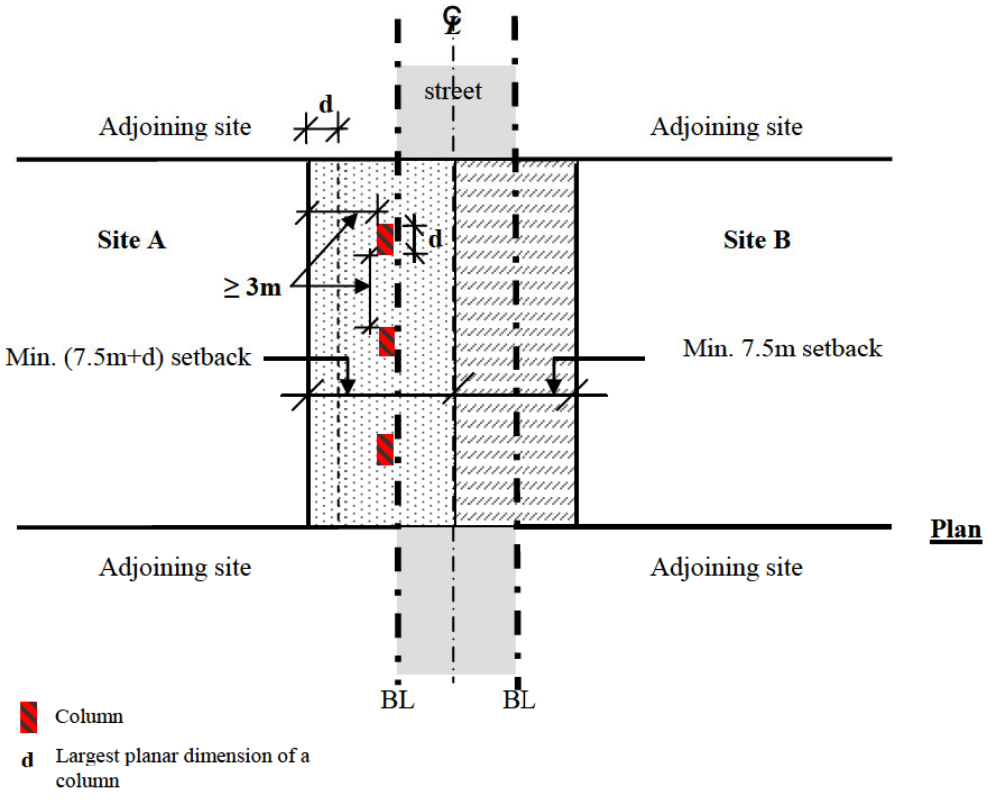


Fig. C2 Building setback as detailed in paragraphs 7(a) and 8(c)

Appendix C
(PNAP APP-152)

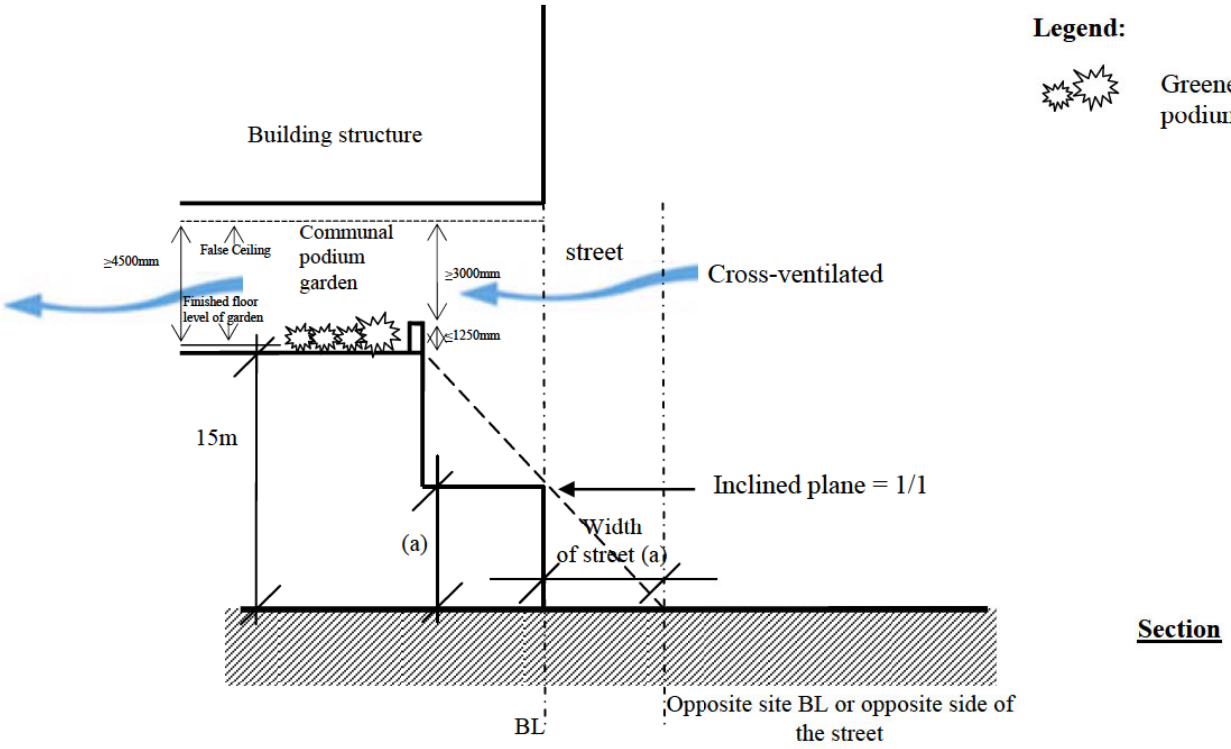


Fig. C3 Stepped building profile with communal podium garden as detailed in paragraph 7(b)

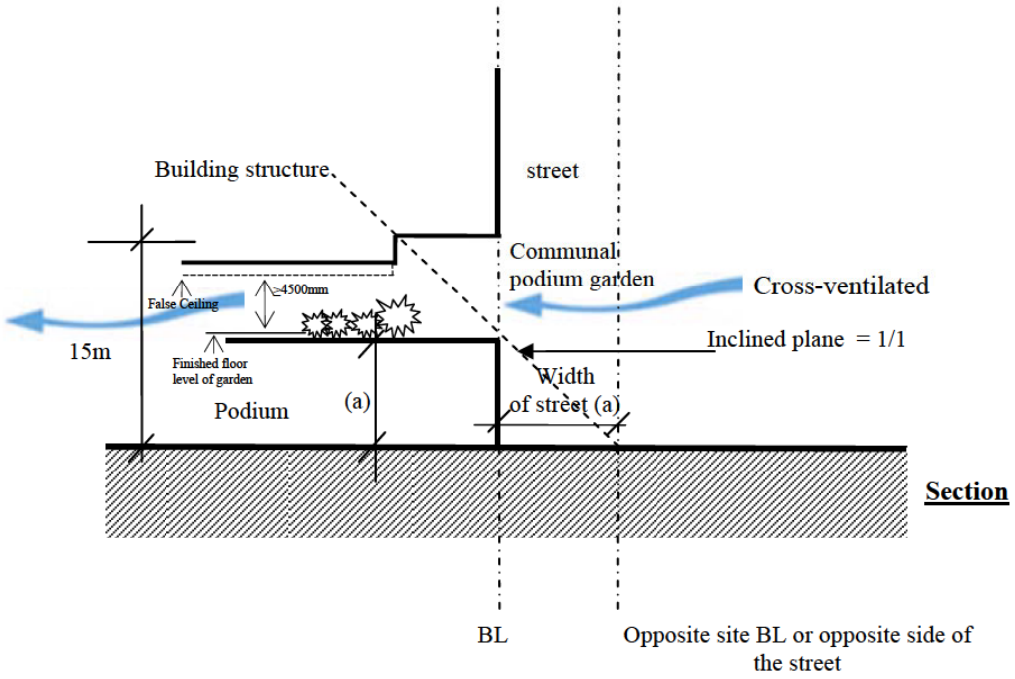
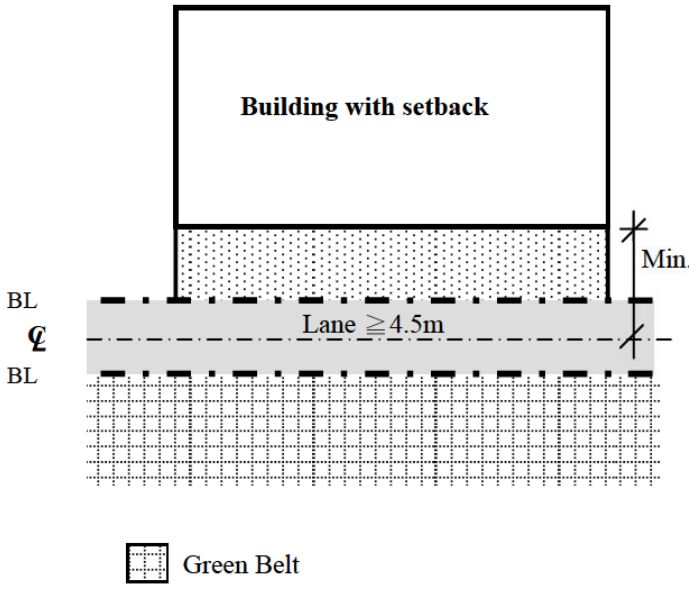


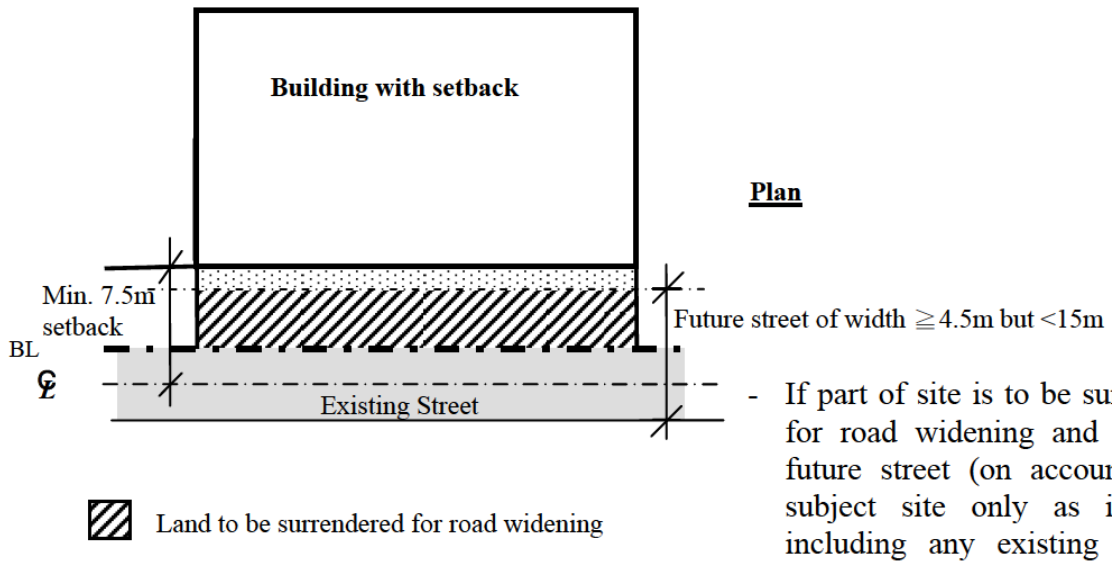
Fig. C4 Stepped building profile with communal podium garden as detailed in paragraph 7(b)



Notes:

- Check if lane falls under the definition of "street" in Appendix A
- Likelihood of future development within Green Belt cannot be precluded. Hence, Green Belt should not be regarded as lane
- If width of the lane is ≧4.5m but <15m, building setback is required

Fig. C5 Example (1) of Building Setback - Site abutting narrow lane with Green Belt beyond



- If part of site is to be surrendered for road widening and width of future street (on account of the subject site only as indicated) including any existing street is ≧4.5m but <15m, building setback is required from the centreline of the existing street.

Fig. C6 Example (2) of Building Setback – Portion of Site will be surrendered to form a future street

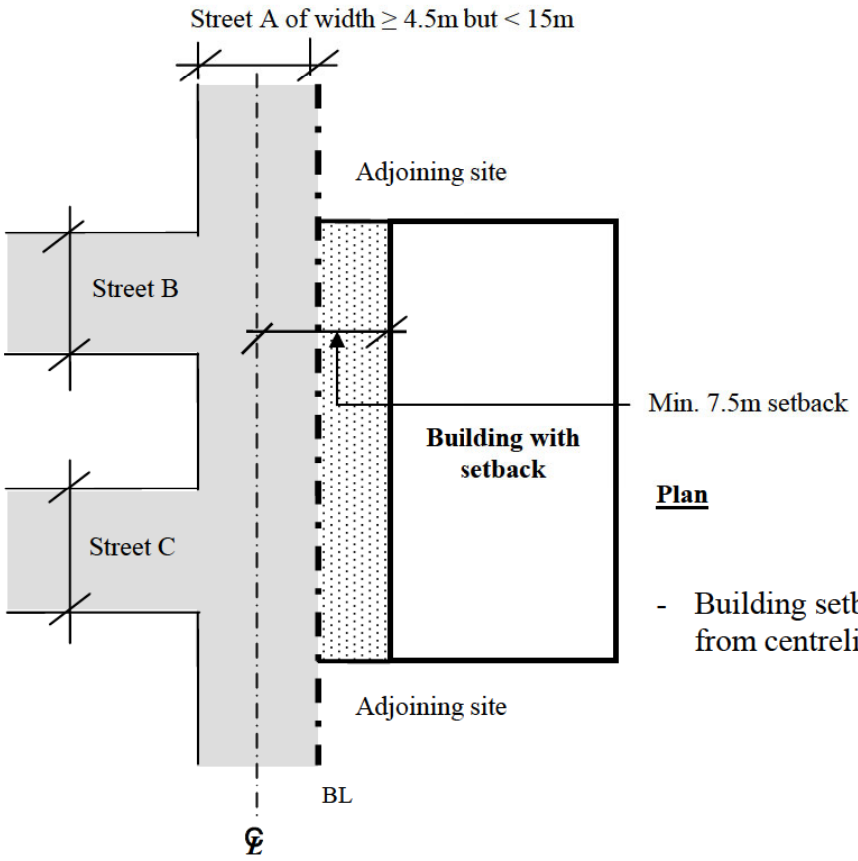
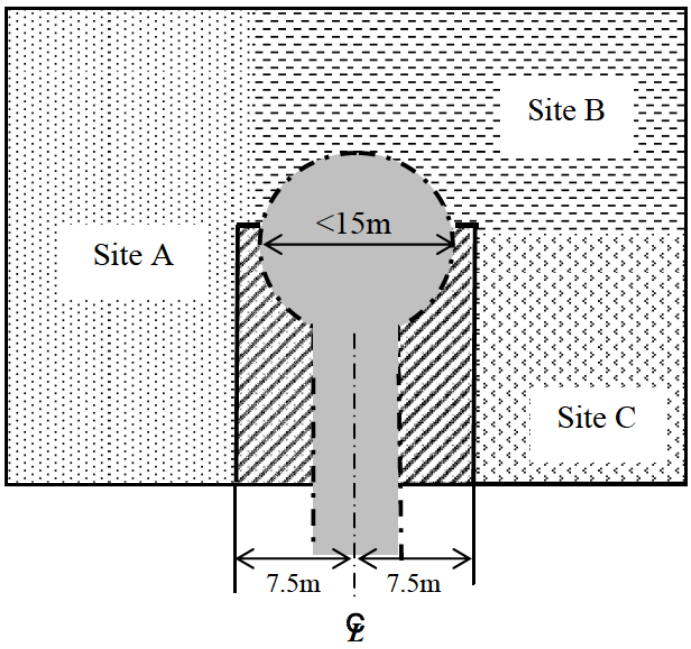


Fig. C7 Example (3) of Building Setback - Site abutting streets at intersections

Fig. C8 Example (4) of Building Setback – Site at the end of the street/ cul-de-sac



Plan

- For Site B abutting the cul-de-sac, building setback is not required.
- For Site A & C abutting the street with width ≧4.5m but <15m, building setback (hatched area) is applicable.

Fig. C9 Example (5) of Building Setback – Site abutting cul-de-sac

(Rev 1/2016)

Appendix D
(PNAP APP-152)

Site Coverage of Greenery

1. All *greenery areas* should be measured horizontally based on the soil[1] areas as shown on the plan in the following scenarios (see Figure D1):

   (i) greenery areas are uncovered;

   (ii) greenery areas in the form of projecting planters[2] are shadowed vertically by parts of the building or other projecting features, and the clear height of the building or projecting features above the covered area is not less than 8 times the horizontal width of the covered area;

   (iii) greenery areas in the form of projecting planters[2] are shadowed vertically by other projecting planters, and both planters comply with the requirements stipulated in paragraph 9 of PNAP APP-19; or

   (iv) greenery areas in the *primary zone* are shadowed vertically by buildings (including overhangs), and when measured from the 45° projected line taken from the edge of the building, they fall within the area; and they are accessible to the public, visitors or occupiers from the adjoining open areas.

2. A multiplying factor of 2 is applicable in computing the greenery area of a green buffer complying with the requirements stipulated in Appendix C1 of PNAP APP-151, irrespective of whether the specific standard of enhanced greenery provision is adopted.

3. The summation of following greening features may be accepted to contribute not more than 30% of the total required *greenery areas* of the overall provision as specified in Table 2 of this PNAP subject to its location and application of a reduction factor where applicable.

---

1 For reference, the recommended minimum soil depths for trees, shrubs, grass/ground covers are 1.2m, 0.6m and 0.3m respectively.

2 Greenery areas in the *primary zone* should be fronting or visible to the public from a street/a public pedestrian way/public open space. Greenery areas above the *primary zone* should be visible to the public, visitors or occupiers.

Greening Features	Location	Reduction Factor in Computing the *Greenery Areas*
Covered greenery areas[3] accessible to public, occupiers or visitors from adjoining open space	*Primary zone* (measured from 45° projected line taken from the edge of building)	50%
Water features[4]	*Primary zone* or uncovered communal roof	50%
Grass paving	Except carparking spaces or loading / unloading areas	50%
Planters on an inaccessible roof	Primary zone	50%
Vertical greening[2]	No restriction	Nil
Landscape-treated Greening on slopes / retaining structures[5] with gradient steeper than 45°	No restriction	Nil

4. Irrigation points/automatic irrigation system and drainage system should be provided at *greenery areas* to facilitate future maintenance. In addition, where greenery is provided on the roof, the roof should be of impervious construction and the design dead load on the roof should also take into account the anticipated loads of the soil, plants, trees, etc.

5. Greenery in removable pots/planters that are not permanently fixed or built into the development should not be counted as greenery area.

6. Covered greenery above the *primary zone* such as in covered communal podium garden or sky garden should not be counted as *greenery area,* except for the scenarios in paragraph 1 above.

---

3 When selecting planting design and species for covered greenery, reference should be made to "Proper Planting Practice – Provide Sufficient Growing Space between Trees and Adjacent Buildings / Structures" issued by Greening, Landscape and Tree Management Section of DEVB (www.greening.gov.hk).

4 Water features should be measured by the horizontal water surface area. Swimming pool and jacuzzi are not considered as water features. Filtration plant room for water feature may be exempted from GFA but subject to compliance with the pre-requisites and the overall GFA cap on GFA concessions stipulated in PNAP APP-151.

5 Greening on slopes/retaining structures should be measured by the projected elevational area of the soil where the greenery will grow. Greening on slopes/retaining structures with gradient equal or less than 45° will be measured horizontally based on the soil area as shown on the plan.

7. *Vertical greening* should be measured by the elevational area of the vegetated panel/modular planter or panel, or the vertical frame (for climbing and/or weeping plants) where the greenery will grow. For *greenery areas* provided by climbing or weeping plants, those part of the vertical frames with a height more than 7.5m are not accountable. The horizontal area of soil in planters under the vertical frame/modular planter/panel already counted for vertical greening as aforesaid should be excluded from the *greenery area* calculation. Self-clinging climbing plants on hard surfaced walls should be measured horizontally based on the soil areas as shown on the plan (not counted as vertical greening).

8. All *greenery areas* for the purpose of this PNAP should be designated as common parts of the building. Access for maintenance and replacement of the plants should be provided from common parts of the building. As for the planters on the inaccessible flat roofs, communal access paths should still be provided from the common areas for maintenance of the planters.

9. Tree planting can provide localized thermal relief in urban environment. Provision of tree cluster is encouraged. Reference could be made to the requirements stipulated in Appendix C1 of PNAP APP-151, irrespective of whether the specific standard of enhanced greenery provision is adopted.

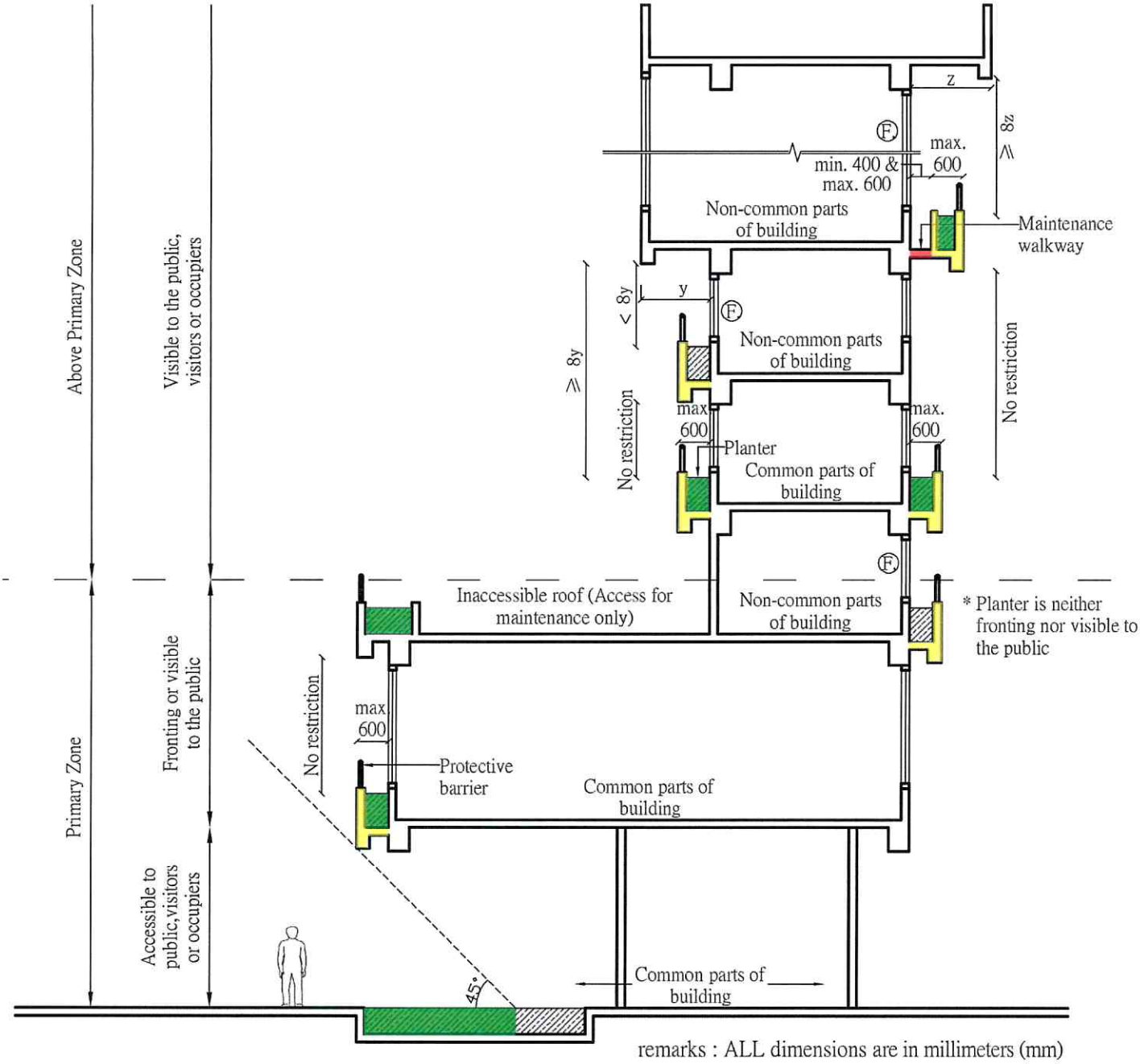
10. When granting modifications under section 42 of the Building Ordinance for GFA concessions applied under PNAP APP-151, the Building Authority (BA) may impose, but not limited to, the following conditions: -

    (a) The *greenery areas* should not be used for any other purposes without the prior consent of the BA.

    (b) The restriction on the use as stated in item (a) above and the *greenery areas* to be designated as common parts should be incorporated into the Deed of Mutual Covenant (DMC) with details of their size (in area), locations and the common access thereto clearly indicated on a plan(s). Where no DMC is to be in force, such restriction and designation should be incorporated into the Sales and Purchase Agreement, Assignment or Tenancy Agreement.

    (c) The letter of undertaking for complying with the requirements as stated in items (a) and (b) above, submitted by the developer or owner in support of the application for GFA concessions should be registered in the Land Registry before applying for the occupation permit.

Measurement of Greenery Area



Typical Section (not to scale)

Fig. D1 Greenery as per paragraph 1 of this Appendix

(Rev. 9/2023)

Appendix E
(PNAP APP-152)

Alternative Approaches

Principles

Pursuant to paragraph 12 of this PNAP, in recognition of the genuine constraints in compliance with the SBD Guidelines under the special circumstances of individual cases, the BA takes a flexible and pragmatic stance in accepting:

(a) performance-based approach in justifying alternative designs that can achieve equivalent standards, or

(b) inadequate provisions of a particular key design element when mitigated by other effective compensatory measures such as enhancement in the provision of other key elements or by the consideration of the unique context of the site e.g. sites with unobstructed surrounds, such as piers.

2. Alternative design proposals and applications for exemption or modification of the building separation, building setback and site coverage of greenery requirements should be supported by justifications. Where necessary, such proposals and applications may be examined by the Building Committee or the Expanded Building Committee (collectively as BC) composing of external experts in the relevant fields. The BA may take into account recommendations from the BC and other relevant considerations in determining acceptance of the proposal.

Building Separation

Alternative Design for Waiving Low Zone Assessment

3. The building separation requirement at the low zone may be waived for buildings with:

(a) less dominating building bulk – the site coverage for the building including any podium does not exceed 65% of the site; and

(b) adequate setback along *street* frontage – the full height of the building is set back[1] from a site boundary abutting any *street* such that the total frontage of such setback is not less than 50% of the length of that boundary and not less than 10m long or the full frontage for site with frontage less than 10m; and the total setback area is not less than 15% of the site area.

Performance-based Design Alternative

[1] Reference is made to the design criteria on the setback approach under PNAP APP-132

4. To allow for flexibility in building design where the prescriptive requirements specified in Design Requirements (1) and (2) as mentioned in paragraph 4 of this PNAP cannot be fully met, the adoption of performance-based design alternative on the provision of building separation may be accepted on the conditions that:-

(a) Provision of the minimum P as specified in Table 1 for each assessment zone; and

(b) Satisfactory demonstration by *air ventilation assessment* (*AVA*) that the buildings' potential impact on the local wind environment has been duly considered and that by comparing with a baseline case which complies with the above Design Requirements (1) and (2), the proposed design is equivalent or better in external air ventilation terms.

5. The *AVA* shall be done by referring to the latest methodology and requirements of Technical Guide for Air Ventilation Assessments[2] using wind tunnel modelling or digital representation of the physical and wind environment using *Computational Fluid Dynamics (CFD)* simulations.

6. For projects adopting a performance-based design alternative, the following information with full justifications for deviation from the prescribed requirements should be submitted preferably in two stages to avoid abortive work:

Stage 1 Submission

(a) An expert evaluation on whether the tools and methodologies for *AVA* employed are fit for the purpose and are suitably verified and scientifically validated with practical merits shall be carried out. In this connection, submission for prior acceptance of all information listed below covering factors like site configuration, local topography, wind characteristic and sensitive receivers in the surrounding areas, relevant urban climatic considerations, etc. is required:

(i) a baseline case that fully complies with all the prescriptive Design Requirements (1) and (2);

(ii) details of scientific bases to assess performance;

(iii) analysis tools and/or design procedures;

(iv) modeling input, settings and parameters for the analysis and/or design;

(v) limitation and applicability of the proposal in context;

(vi) interpretation of results;

(vii) method of verification;

(viii) similar established standard and implementation in other places; and

(ix) documented references of the scientific bases.

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[2] The Technical Guide is issued by the Planning Department and is available from the website at (http://www.pland.gov.hk/pland_en/p_study/comp_s/avas/avas_eng/avas_mtguide_p01.html)

Stage 2 Submission

(b) A study report on whether the proposed scheme will be in line with urban climatic considerations and such similar requirements as imposed through the town planning approval process or in Government lease; and

(c) An *AVA* report on whether the proposed scheme will perform better in external air ventilation terms, demonstrated by the simulation results of the proposed scheme as compared to the simulation results of the baseline case.

7. Upon approval of the proposal, additional three hard copies and an electronic copy in Acrobat format for each *AVA* report shall be submitted together with a copy of the completed *AVA* register[3] for inclusion in the register kept by the Planning Department.

Special Considerations for Buildings with Unique Functional Requirements or Heritage Value

8. For alteration and addition of an existing building resulting in a new building involving the adaptive reuse of historic building or for certain new buildings with special functional requirements in building length and/or bulk e.g. infrastructural facilities, transport terminus, sports and civic facilities, the BA may exempt such historic buildings or special facilities from the building separation Design Requirements (1) & (2) if the equivalent performance is proven and compensatory measures are provided as follows:

(a) An *AVA* by wind tunnel or *CFD* has been conducted to demonstrate that the design for the proposed new building has outperformed another viable notional scheme[4] in accordance with the methodology and requirements stipulated under the category of Microclimate Around Buildings (S_A8) of the BEAM Plus[5] certification; and either one of the following three requirements under the aforesaid category has been complied with; and the results of which are considered acceptable by the BA:

(i) wind amplification – no pedestrian areas will be subject to excessive wind speeds;

(ii) elevated temperatures – providing shade; or

(iii) elevated temperatures – providing suitable roofing material or vegetation roof.

---

[3] AP is requested to seek consent from the owners to release the information contained in the *AVA* proforma (https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf) and / or the *AVA* reports for public inspection. For projects which cannot be disclosed to the public due to confidentiality or consent from owners has not been given, the information would be kept solely for the government's internal reference.

[4] Viable notional scheme is a practically viable scheme complying with relevant statutory and allied requirements but excluding those on building separation for demonstrating the improvements to be achieved by the proposed design.

[5] BEAM Plus for New Buildings. (http://www.hkgbc.org.hk/eng/beamplus-main.aspx)

(b) Building features such as additional building setback, stepped profile of the podium from the adjoining streets and communal podium garden to separate the podium from the tower above and to promote air flow at pedestrian level, etc. have been considered in the assessment described in item (a) above and incorporated in the design, where appropriate; and

(c) Building separation requirement is fully complied with for other buildings on the same site or other parts of the building that are located above such special facilities or historic buildings, where applicable.

Proposal involving both new and existing buildings in a site

9. In principle, provided that new buildings will not increase the *Lp* of the existing building, the BA may exempt the existing building from the building separation requirement by disregarding them from the assessment zone.

Building Setback

10. Where the setback of a building will result in a setback area of more than 15% of the area of the site, requirement for building setback may be relaxed if the following compensatory measures are provided:

(a) Full height and full frontage setback of the building from the site boundaries abutting any narrow streets from the respective site boundaries with a total setback area which is not less than 15% of the area of the site provided that such area will contribute to improving the street environment; and

(b) For small sites not exceeding 1,000 m^2, greenery should be provided at the Primary Zone such that the greenery area is not less than 50% of the setback area. All greenery areas shall comply with the requirements in Appendix D where applicable.

Site Coverage of Greenery

11. For sites with genuine difficulties in providing greenery along the street frontage or in the primary zone but with abundance of sustainable natural landscape at the back, the BA may favourably consider the provision of welcoming "green" path to the street pedestrian for viewing such natural landscape as an alternative.

12. For sites with development in phases, while the level of provision of greenery should base on the area of the whole site, notional site area may be applicable to a certain phase of the development for the greenery area to be provided for that particular phase.

(1/2016)

Appendix F
(PNAP APP-152)

Information and Documents to be Submitted

To demonstrate compliance with the building separation, building setback and site coverage of greenery requirements, the following information should be provided for consideration: -

Building Separation

(a) 1:500 layout plans each showing the site in relation to its adjoining *streets* and surrounding buildings and features. The footprint (external walls) of the proposed buildings within the site, the provided *IS*, *PE*, the selected orthogonal projection planes, air corridors and air paths are to be clearly shown to demonstrate compliance with the building separation requirements for each low, middle and high zones.

(b) Plans, elevations and sections at a legible ratio (preferably not less than 1:300) with supporting calculations showing the *U*, the maximum *Lp* of buildings and groups of buildings in comparison to the permissible *Lp*; *S* provided in comparison to the required *S*; and *P* of buildings achieved at each low, middle and high zone, in comparison to the minimum *P*.

Building Setback

(c) A block plan showing the location of the subject site and the width of all adjoining *streets*;

(d) Where the width of any *street* is less than 15m, further details such as level(s) of the *street* for computing the amount of required setback.

(e) 1:100 plan(s) and section(s) with calculations demonstrating compliance with the building setback requirements.

(f) Information showing the compliance of *greenery areas* requirement under paragraph 10(b) of Appendix E (as detailed in items (g) and (h) below).

Site Coverage of Greenery

(g)* Plans at a legible ratio (preferably not less than 1:300) showing the locations of the proposed *greenery areas*, the common access thereto and details of relevant street, public pedestrian way, public open space for compliance with the requirement of *greenery areas* at *Primary Zone*(s).

(h)* A schedule with calculations and illustrated diagrams showing the area of proposed greenery at each location for compliance with the minimum site coverage of greenery requirements.

Note

* Information to be updated and soft copy to be submitted at the time of submitting application for occupation permit. The soft copy should be in PDF format with 200 dpi resolution.