

5. Right Place

5.1 Introduction

Each street has its own spatial limitations set by relevant standards and guidelines which form the basic and fundamental requirements for safety of road users including pedestrian and motorist. In order to maximise tree planting opportunity and fulfil the fundamental safety requirements, early coordination between Engineers, Landscape Architects and Designers is required at planning and design stage.

Existing urban street spatial elements and surrounding conditions within urban Hong Kong areas were identified and analysed. These streets were first categorised into 3 main road hierarchies, Primary Distributor Road, District Distributor Road and Local Distributor Road as defined in the Transport Planning and Design Manual (TPDM) as a baseline. Further analysis was conducted on the spatial conditions and the surrounding environs of these 3 road hierarchies. These road hierarchies were then further categorized into 7 main street typologies and 14 sub-types based on the street surroundings.

Expressways, highways and trunk roads were not covered in this Study as they are considered to have very specific requirements and special needs different from the common street typologies. Pedestrianised streets were also excluded in this Study due to their special street characteristics. For the purpose of this Study, urban areas mean built-up areas within the Hong Kong Island, Kowloon and the New Territories.

5.2 Review of Existing Roadside Tree Planting Standards Requirements & Guidelines

To form a baseline for further study into the existing urban street conditions, the latest technical requirements, standards and guidelines relevant to roadside planting were analysed and summarised in ***Figure 5-1*** and ***5-2***.

RELEVANT ROADSIDE PLANTING REQUIREMENTS AND GUIDELINES

GENERAL NOTES

Tree Planting and other Form of Roadside Planting Aspects

- Landscape areas should be identified in the early planning stage, so long as the minimum clear width of footpath can be provided.
- Planting can be used to change the perceived width of a road, to define a gateway and to improve the overall environment.
- Trees should be planted clear of traffic signals and/or traffic signs to ensure their visibility. Furthermore, they should not be planted in such locations that may hinder the operation and maintenance of speed enforcement cameras and traffic surveillance equipment/facilities, such as CCTV cameras, automatic incident detectors, police observation spots, etc.
- Trees should be planted at least 5m (measured along the carriageway) away from the approach side of a pedestrian crossing, run-in or a bus stop.
- Trees should be planted at least 10m (measured along the carriageway) away from a road junction.
- A minimum lateral clearance of 500mm should be maintained between the outside part of the tree trunk including tree guard and kerbside. This dimension should be increased to 1.0m for high speed roads with a designed speed limit of 70km/h or above.
- Adequate footpath widths should be maintained to cater for pedestrian traffic.
- For avenue/street tree planting, the trees should normally be spaced at a minimum distance of 5m from centre to centre. However, such requirement is not applicable if the trees are planted at the back of a footpath or in the CMGZ.
- Lowest tree branch overhang the carriageway should have a minimum height clearance of 5.5m. If the branch overhang occurs above a footpath or cycletrack, it should have a minimum height clearance of 2.5m.
- Trees planted within visibility splays should have a high canopy and a single slender trunk to ensure obstruction of driver vision is minimised.
- Trees should be planted at least 5m from existing street lighting to avoid shading effect.
- Agreement should be obtained from the relevant maintenance authority for the future maintenance of trees, including trimming of branches, felling and transplanting, if necessary, due to traffic management schemes.
- Tree planting, including small canopy trees, upright tree/palm with narrow trunks, turf, groundcovers or low shrubs, is allowed along the kerbside as long as they will not cause sightline and visibility problems. Alternatively, trees can be planted away from the kerb, such as at the back of footpath.
- In the CMGZ of a dual carriageway approach to a roundabout and the central island of a roundabout with diameter less than 10m, tree planting is restricted for preservation of visibility. But groundcovers, turf or low shrubs can be planted.
- To ensure that the raised planters in the vicinity of crossings will not obscure pedestrians, in particular children, from the view of approaching vehicle drivers, nor interfere pedestrians' sightlines to coming traffic, the overall height of the planters including shrubs should not exceed 0.5m within 30m on the approach to a crossing.
- Recommended minimum widths for footpath are dependent on peak pedestrian volume and type of land use. They can be summarized as:
 - Commercial and Residential Land use - 2m to 4.5m
 - Industrial Land use - 3.5m to 4.5m
- Vertical clearance for structures over footpaths:
 - Over and within 0.6m of a carriageway - 5.1m
 - Over a footpath but not within 0.6m of a carriageway - 3.5m
- Projection of signage should not be more than 4.2m from the main building line or beyond the center of the street. Minimum clearance of 5.8m is needed if signage is projecting over a street. If signage is projecting over a pavement, it should have a minimum clear distance of 1m from the kerb and a minimum clearance of 3.5m. Two adjacent signs should have a lateral distance of 2.4m. Two signs erected from opposite sides of street should have a minimum clear distance of 3m.
- Building frontage zone minimum width is to be 1m for areas with shopping frontage.

Maintenance and Management Aspects

- The safe operation of the road as well as method of maintaining any planting or other elements associated with landscaping should be considered at the design stage. In this respect, the maintenance authorities should be consulted on the proposals before they are implemented and preferably during the design process.
- Landscape designs which require frequent and regular maintenance, whether by persons on foot or in slow moving vehicles, which increases the risk to operatives and other road users, must be avoided.
- If tree planting are planned for verges, embankment, cutting or similar, the provision of water supply is necessary.

REFERENCES

1. "Development Bureau Technical Circular (Works) No. 2/2012 - Allocation of Space for Quality Greening on Roads", Development Bureau, 2012.
2. "Guide on Erection & Maintenance of Advertising Signs", Building Department, HKSAR
3. "Hong Kong Planning Standards and Guidelines", Planning Department, HKSAR, 2022
4. "Transport Planning and Design Manual", Transport Department, HKSAR, 2015

Figure 5-1 - Relevant Roadside Planting Requirement and Guidelines

ROAD HIERARCHY FUNCTIONAL REQUIREMENTS								
		PRIMARY DISTRIBUTOR ROADS eg. Nathan Road, Tsim Sha Tsui			DISTRICT DISTRIBUTOR ROADS e.g. Tong Chun Street, Tseung Kwan O		LOCAL DISTRIBUTOR ROADS eg. On Pong Road, Tai Po	
Connection		Major network of the urban area; Connecting centres of main urban areas, main centres of population and activities			Main road network within district		Road network within districts	
General Design Characteristics		<ul style="list-style-type: none"> High capacity roads Limited to no frontage access Segregation of pedestrians from vehicular traffic Grade separated junctions preferred At grade junctions should be at least 300m apart 			<ul style="list-style-type: none"> High capacity junctions Peak hour stopping restrictions Some direct frontage access 		<ul style="list-style-type: none"> Direct frontage access On street parking permitted 	
Carriageway Min. Width	Single Carriageway	6.75-7.3m (2 lane)	10-11m (3 lane)	13.5-14.6m (4 lane)	7.3 or 10.3m (2 lane)	13.5m (4 lane)	7.3 or 10m (2 lane)	13.5m (4 lane)
	Dual Carriageway				6.75 (2 lane)	10m (3 lane)	6.75m (2 lane)	
Max. Speed		50km/h			80km/h		50 km/h	
Sight Distance	Desirable Min.	70m			145m		70m	
	Absolute min.	50m			110m		50m	
24 Hour Stopping Restrictions		Yes			Peak hour stopping restrictions		May be required, but normally only in the vicinity of junctions.	
On-street Parking Provision		No			Restricted		May be permitted	
Minimum Headroom for On-street Parking	Private Cars						2.4m	
	Light good Vehicles						3.6m	
	Medium and Heavy goods Vehicles						4.7m	
	Container Vehicles						4.7m	
	Coaches and Buses						3.8m	
	Light Buses						3.3m	
Min.horizontal Clearance from the Carriageway to Obstruction	Away or towards object but not steeper than 2.5% carriageway crossfall	Height of object ≥ 3m above 1m	Height of object < 3m above 0.6m		Height of object ≥ 3m above 0.5m	Height of object < 3m above 0.5m	Height of object ≥ 3m above 0.5m	Height of object < 3m above 0.5m
	Towards object steeper than 2.5% carriageway crossfall	Height of object ≥ 3m above 1m	Height of object < 3m above 0.6m		Height of object ≥ 3m above 0.6-0.8m	Height of object < 3m above 0.6m	Height of object ≥ 3m above 0.6-0.8m	Height of object < 3m above 0.6m
Min. Width of Central Reserves		2.3m			1.8m		1.8m	
Min. Width of Roadside Verge Greening Zone		2m			2m		1.5m	
For Central Median Greening Zone		Visibility shall not be interfered and the width of central reserve shall be suitably widened to provide sufficient plant growing space with automatic irrigation system. Only low shrubs or small upright trees/palms with narrow trunks can be planted on the central reserve within the sight line envelope.						
Parking and/or loading /unloading space if likely to interfere with through traffic flow		An additional 3m width on one or both sides of the carriageway should be provided						

REFERENCES

1. "Hong Kong Planning Standards and Guidelines", Planning Department, HKSAR, 2022
2. "Technical Circular (Works) No.: 2/2012 - Allocation of Space for Quality Greening on Roads". Development Bureau, HKSAR
3. "Transport Planning and Design Manual". Transport Department, HKSAR, 2015

Figure 5-2 - Road Hierarchy Functional Requirements

5.3 Methodology

There are many spatial considerations from different government standards and guidelines related to the 3 main road hierarchies. Out of all steps, the first and most important step should be to examine the suitability and feasibility of tree planting in the street. Should tree planting be deemed possible, the next step is to identify the road hierarchy and the immediate street environs. This shall give a comprehensive baseline of the spatial considerations for that particular street. Methodology to determine the feasibility of street tree planting is shown in the flowchart below (**Figure 5-3**).

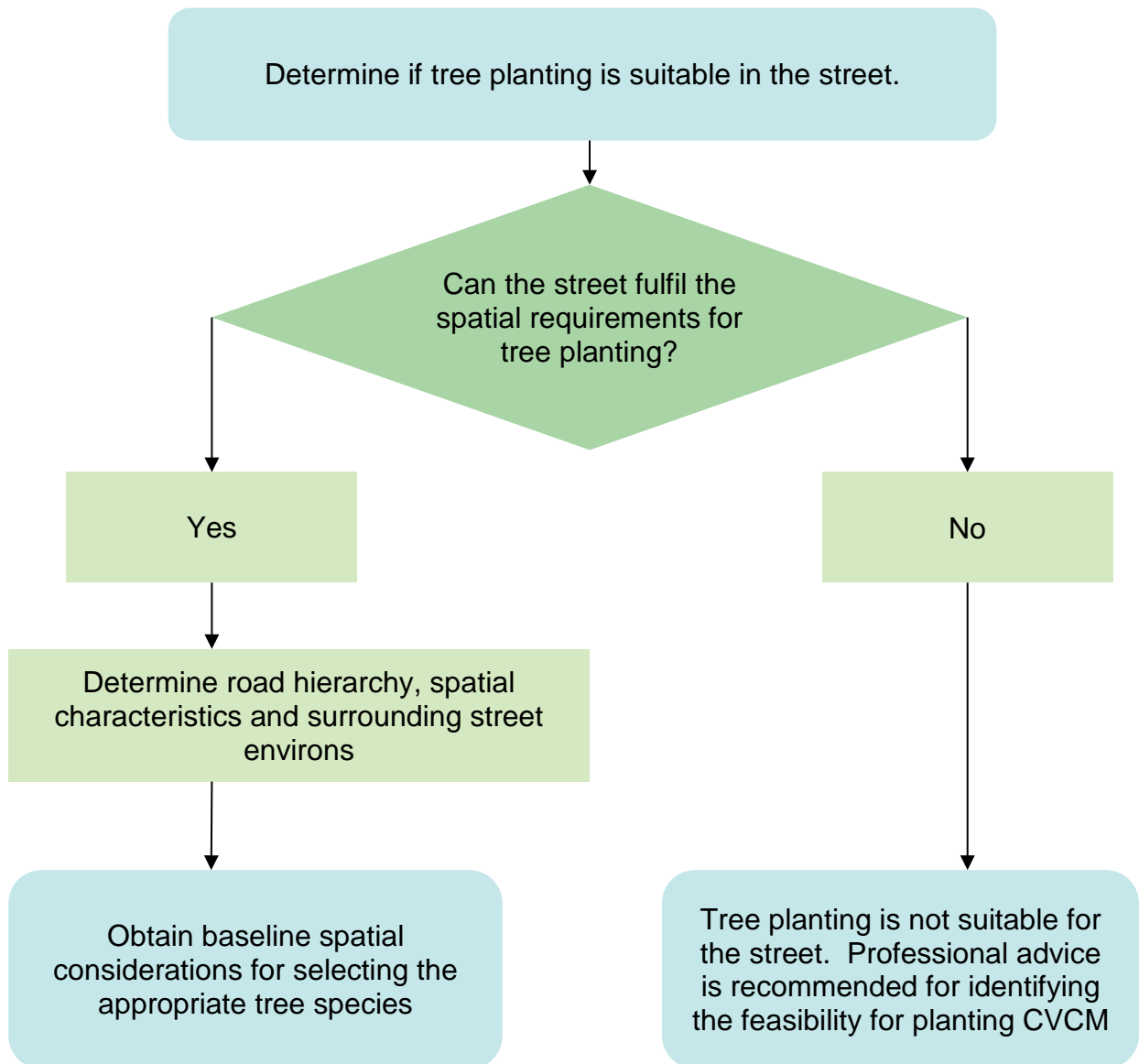


Figure 5-3 – Methodology to Determine Suitability of Tree Planting in a Street

5.4 Spatial Requirements for Tree Planting

Before considering the tree species, the street should first be analysed for their feasibility to support tree planting. There are 5 main spatial factors to determine the suitability of tree planting in a street location. These are existing underground utilities, through zones requirement and pedestrian flow, building frontage zone requirement, location of bus stops/loading and unloading bays and overhanging structures.

In order for street tree planting to be sustainable, it is essential to satisfy the requirements of these 5 main spatial factors to avoid conflict, creating obstruction and hence reducing subsequent maintenance and premature decline of trees. If these factors cannot be fulfilled, that particular street location is considered unsuitable for street tree planting. Details of these 5 main spatial factors are given below.

It should be noted that these 5 factors may not truly reflect the site context because each street environment is unique. Professional advice from Landscape Architects is recommended to be sought to ensure all suitable roadside planting areas are being explored.

Sufficient Soil Volume & Existing Underground Conditions

The presence of underground utilities, including telecommunications, electricity distribution, town gas pipes, traffic/street light cables, storm water drains, fresh water and wastewater pipes etc., usually located beneath footpaths and limited the underground space and thus available soil volume for tree root growth. Other underground conditions, such presence of boulders or man-made structures (e.g. basement ceilings) may further limit the underground space. Refer to the “Guidelines on Soil Volume for Urban Trees” by GLTMS, on the minimum soil volume for different desired tree size. Another factor to consider is the proximity of underground structures or utilities to the root growth zone. Additional maintenance difficulties may occur if excavation is required close by the tree protection area. Alternative measures to reduce conflict with underground utilities can be considered in the early planning and design stage, e.g. installation of root barriers to minimize future maintenance complications. Structural elements, such as structural frames and soil cells, can also be assembled underground to enlarge soil volume whilst providing a load-bearing structure to the footpath.

Through Zone

The basic function of a footpath in an urban street is to ensure pedestrian safety by providing a clear physical separation and demarcation from vehicular traffic (the carriageway) with the footpath. The width of the footpath (Through Zone) should be sufficient to cater for basic pedestrian flow and be freely accessible by the disabled. Ideally, this zone should be free of obstructions. In general, the minimum width requirement for the Through Zone is 2m, which is considered sufficient to provide an adequate environment for two-way flow by pedestrians and wheelchair users, especially on streets with moderate to low pedestrian flow. In general, footpaths with Through Zone less than 2m wide are not recommended to plant trees.

Building Frontage Zone

The Building Frontage Zone is the area between the Through Zone and the edge of buildings. It is a separate zone and cannot be calculated as part of the Through Zone. This zone accommodates cross movements into adjacent buildings, allows area for browsing and shopping frontages and provides pedestrians with additional moving space adjacent to buildings. As such, it is not recommended to

plant trees within this zone to prevent obstruction. According to HKPSG, Building Frontage Zone with width of 0.5m should be allowed for dead areas and increased to 1m for streets with active shopping frontages.

Location of Bus Stops, Loading and Unloading Bays, Pedestrian Crossings and Run-in

Bus stops and loading and unloading bays include areas dedicated to coaches, school buses, public buses and cars for passenger pick-up and drop-off. As these areas indicate regular and active pedestrian traffic, tree planting is not recommended as it may cause sightline blockage and safety issues. Trees should be planted at least 5m away from the approach side of a bus stop, loading and unloading bays, pedestrian crossing or run-in.

Overhanging Structure

Streets with overhanging structures covering part or an entire planting area of a street (e.g. above ground signs and building structures) may limit tree canopy growth. Depending on the extent of the overhead structures, the effect can be significant. It is noted that tree planting opportunities directly under overhanging structures are limited due to extended periods of overshadowing and space restrictions. There may also be conflicts with access requirements as certain types of overhanging structures may require frequent maintenance which will greatly limit the planting area size and thus the type of suitable planting species. Tree planting areas with overhanging structure covering the whole or part of the planting area along the street should be reviewed on a site-by-site basis.

5.5 Road Hierarchy

The road hierarchy classification system defined in the TPDM is adopted in this Guide for identifying the street location type because this system best reflects a set of standardised road dimensions and associated footpath standards that are well understood and typically used in Hong Kong across different professional disciplines.

The 3 main road hierarchies in urban areas (including Hong Kong, Kowloon and New Towns) comprise of the following:

- (a) Primary distributor roads: Roads connecting the main centres of population. High capacity roads, with no frontage access or development, segregation of pedestrians, widely spaced grade-separated junctions, and 24 hour stopping restrictions ²⁴;
- (b) District distributor roads: Roads Linking Districts to the Primary Distributor Roads. High capacity at-grade junctions, with peak hour stopping restrictions and parking restrictions throughout the day²⁴; and
- (c) Local distributor roads: Roads within Districts linking developments to the District Distributor Roads²⁴.

²⁴ Transport Department, HKSAR Government. (2013). *Transport Planning & Design Manual*. Print.

5.6 Spatial Characteristics and Surrounding Street Environs

Spatial characteristic and functional requirements which affect tree species selection considerations in the 3 road hierarchies will be selected for further analysis. These spatial characteristics can be generalised into 3 major categories in which the street typology can be identified. (Refer to **Figure 5-6**) These are summarised below:

Greening Zones

2 types of greening zones are associated with street tree planting. They are -

- Central Median Greening Zone (CMGZ) is the greening zone at the central median of a carriageway. According to DEVB TC(W) No. 2/2012, CMGZ only occurs in the primary distributor roads and district distributor roads ²⁵.
- Roadside Verge Greening Zone (RVGZ) is the verge planting zone adjacent to the footpath. RVGZ is usually found along all 3 main road hierarchies. **Figure 5-4** shows the relationship between CMGZ/RVGZ and a typical road layout.

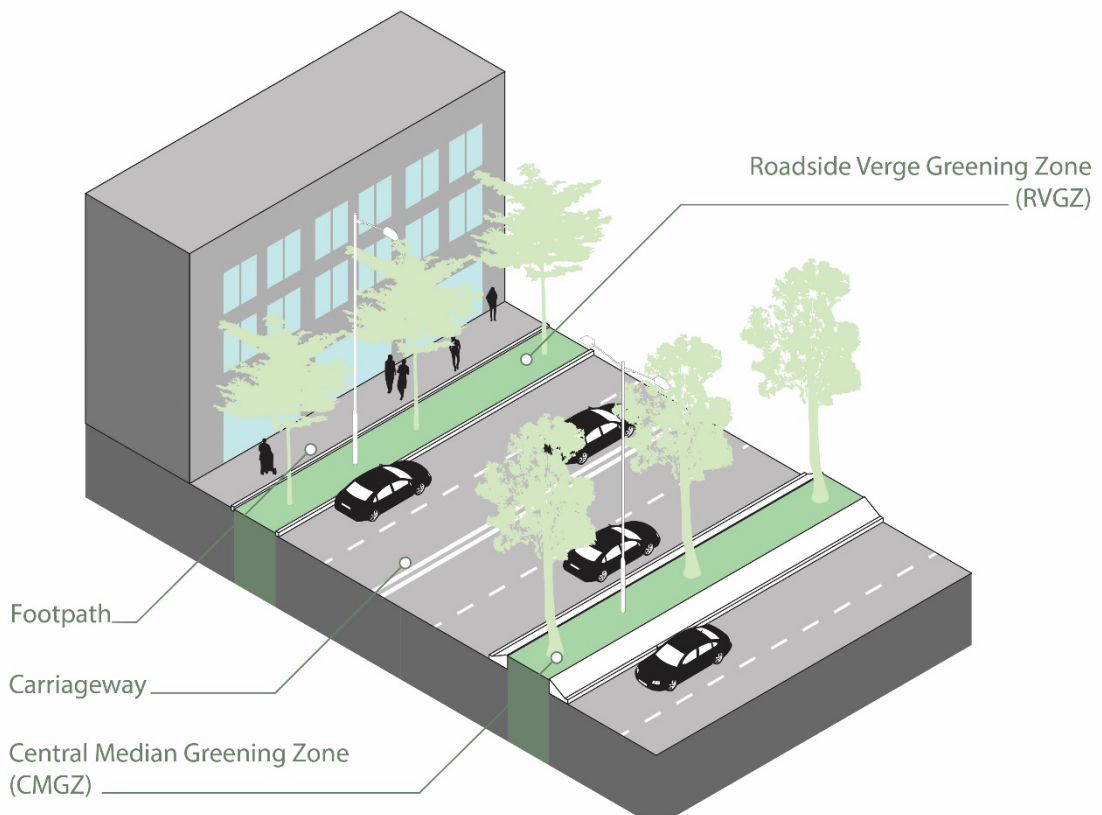


Figure 5-4 Relationship between CMGZ/RVGZ and a Typical Road Layout

²⁵ Development Bureau, HKSAR Government. (2012). *Development Bureau Technical Circular (Works) No. 2/2012 Allocation of Space for Quality Greening on Roads.*

Street Tree Selection Guide

The size of the greening zone can in future be divided into 2 types – wide and narrow, illustrated below.

Greening Zone	Road Hierarchy	Planter Width	
		Wide	Narrow
CMGZ	Primary Distributor Road	≥2.5m	<2.5m
	District Distributor Road	≥2m	<2m
	Local Distributor Road	n/a	n/a
RVGZ	Primary Distributor Road	≥2m	<2m
	District Distributor Road	≥2m	<2m
	Local Distributor Road	≥1.5m	<1.5m

Table 5-1 Planter Width for Different Road Hierarchy

Kerbside Activities

Kerbside activities include loading/unloading, on-street parking and vehicle passenger drop-off at the kerb. To facilitate pedestrian movement, tree pits or shorter, non-continuous planters are recommended. Large trees with aggressive root systems may not be suitable for planting in a confined space as they may cause pavement upheaval.

Interface Conditions

Interface condition refers to the direct interface between footpath and the adjacent land use of a street. 2 types were identified - landscape area or property development.

Landscape area refers to an area with no building development adjacent to the street, and it could be public open space, park, green belt, etc. With close proximity to the existing urban forest, species selection could give priority to those with a higher ecological value to enhance or extend the existing habitat areas.

Property development can be further generalised into 2 types – those with building frontage and those without. Building frontage is defined as buildings with active space adjacent to the footpath. This may include shop frontages, entrances, exits and windows. In these areas, visual and physical blockage must be carefully considered when selecting the appropriate tree species.

Buildings without frontage may be areas where a fence is surrounding the property development, or those parts of the building façade without entrances, exits or windows. Depending on the site context, utilising trees for visual screening can aid to soften the straight architectural lines and create a more human-scale space underneath the canopy.

CHECKLIST OF SPATIAL REQUIREMENTS FOR TREE PLANTING IN STREETS

If all boxes are checked, the street is suitable for tree planting. Professional advice should be sought to identify site specific considerations.

	<input type="checkbox"/> Sufficient soil volume, which is clear of underground utilities, other man-made structures or natural features, achieved
	<input type="checkbox"/> Through zone $\geq 2\text{m}$ achieved*
	<input type="checkbox"/> For active shopping frontage, building frontage zone $\geq 1\text{m}$ achieved OR <input type="checkbox"/> For deadzone, building frontage zone $\geq 0.5\text{m}$ achieved
	<input type="checkbox"/> $\geq 5\text{m}$ from the approach side of a bus-stop/ pedestrian crossing/run-in
	<input type="checkbox"/> $\geq 2.4\text{m}$ from overhanging structures

Note:
 * In general, the min. width requirement for through zone is 2 m according to HKPSG Chapter 8. However, the min. through zone width depends on the land use type and the peak pedestrian volume. (pedestrians per minute). Refer to Table 9 of Section 5.8.15. Chapter 8 HKPSG for the recommended min. width standards for through zone width/ peak pedestrian volume for different land use type.

Figure 5-5 – Checklist of Spatial Requirements for Tree Planting in Streets

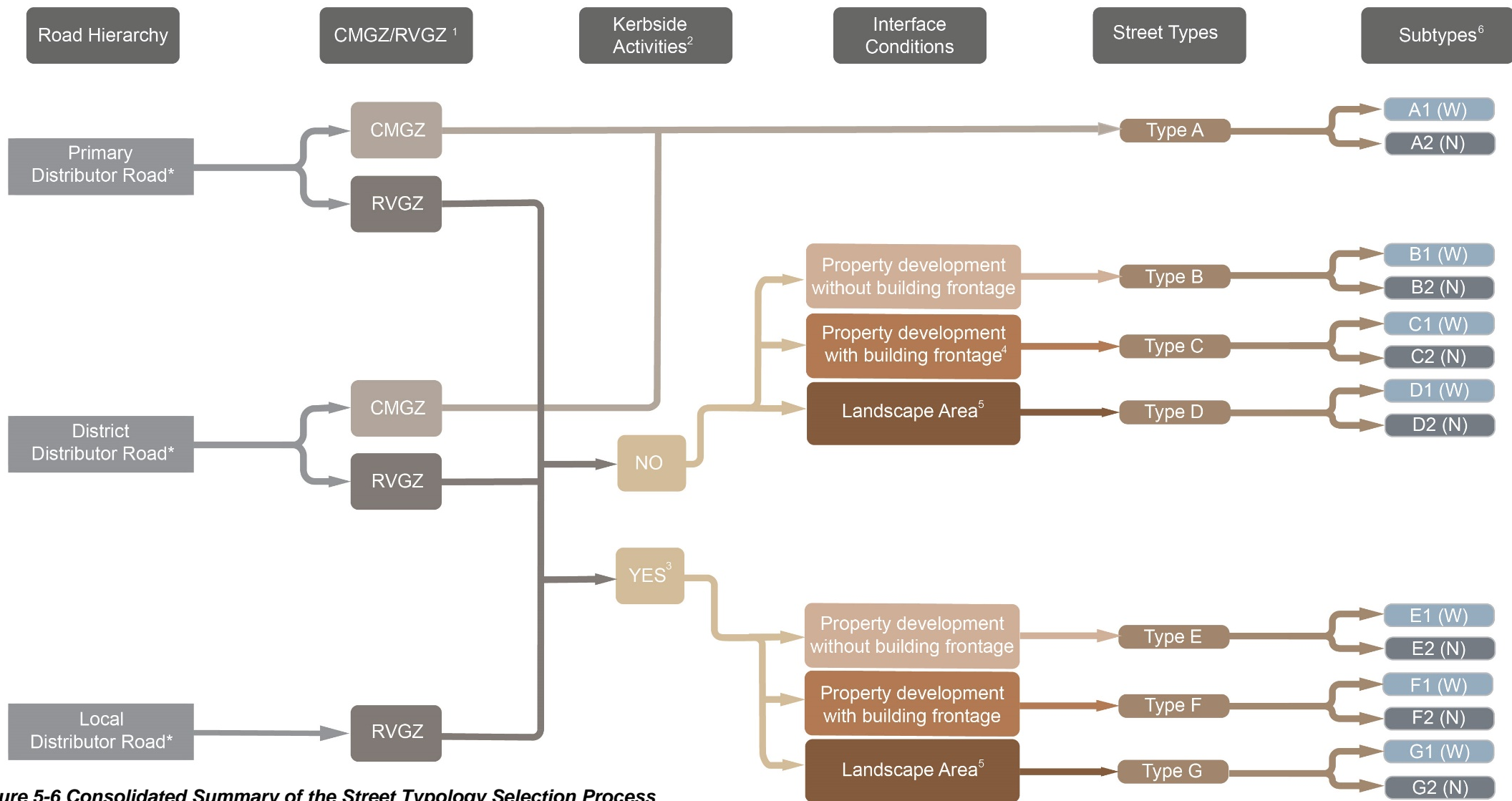


Figure 5-6 Consolidated Summary of the Street Typology Selection Process

* Hierarchy of Roads, Chapter 8 Section 3.1 Hong Kong Planning Standards and Guidelines, Planning Department, HKSAR, 2016. Print

1. "CMGZ" means Central Median Greening Zone
"RVGZ" means Roadside Verge Greening Zone
(Refers to "Allocation of Space for Quality Greening on Roads", Development Bureau Technical Circular (Works) No. 2/2012)
2. "Kerbside activities" include loading/unloading, on street parking, bus stop or any other major activities taking place along the kerb side in the carriageway.
3. Tree pits and other discontinuous RVGZ are recommended for streets with kerbside activities.
4. "Building frontage" includes shopping frontage, doorways, windows, entrances (i.e. no visual/physical blockage required)
5. "Landscape Area" refers to an area with no building development, such as public open spaces, parks, green belt areas etc.

6. Subtype categorize the internal planter width, which means distance between inner wall of planter.
"W" is wide internal planter width, where:
(a) for Primary Distributor Road, the min. width should be 2.5m for CMGZ;
(b) for District Distributor Road, the min. width should be 2m for CMGZ;
(c) for Primary Distributor Road and District Distributor Road, the min. width should be 2m for RVGZ
(d) for Local Distributor Road, the min. width should be 1.5m for RVGZ

- "N" is narrow internal planter width, where:
(a) for Primary Distributor Road, the width is less than 2.5m for CMGZ;
(b) for District Distributor Road, the width is less than 2m for CMGZ;
(c) for Primary Distributor Road and District Distributor Road, the width is less than 2m for RVGZ
(d) for Local Distributor Road, the width is less than 1.5m for RVGZ

(Refers to "Allocation of Space for Quality Greening on Roads", Development Bureau Technical Circular (Works) No. 2/2012)

The selection of tree species in accordance with wide or narrow planters, is to be determined by landscape architects or professional designers.