

1. Introduction

1.1 Overview

The Paris Agreement came into force on 4 November 2016. The Agreement calls for global actions to keep global average temperature increase below 2°C and achieve a balance between carbon sinks and sources within the second half of the 21st century. Hong Kong Climate Action Plan 2030+ (CAP) outlines the action plan for Hong Kong to achieve the targets set out in the Paris Agreement. One of the ways to achieve this is through the planning, creation and improvement of urban forests, green and blue spaces to enhance Hong Kong's overall liveability, biodiversity and climate-readiness.³ Moreover, the Hong Kong Biodiversity and Strategy Action Plan 2016-2021 (BSAP), states that urban forests can serve as important ecological linkages with the countryside and encourage the movement of wildlife. To accomplish this, the following specific actions are recommended in BSAP and relevant to this Guide:

- Formulate an urban forestry strategy that contributes to a sustainable urban landscape, and promote the appreciation of urban biodiversity;
- Promote diversification of soft landscapes and optimise use of native species for enriching urban biodiversity; and
- Recognize the importance of street trees in urban forestry.⁴

In addition, the Hong Kong 2030+ advocates to uplift liveability in Hong Kong by enhancing green and blue space and bringing nature to the increasingly compact city. Under this initiative, the Hong Kong 2030+ seeks to provide a conducive environment for biodiversity to thrive.

The purpose of this Guide is to aid in selecting urban street trees suitable for common road hierarchies in Hong Kong to facilitate tree replacement or new tree planting. It is intended to support strategic street tree planning, urban forest strategy and management and promoting a sustainable built environment as recommended in the CAP, BSAP and Hong Kong 2030+.

1.2 Objective of the Guide

The objective of the Guide is to provide a practical guide to facilitate tree selection for different street typologies of Hong Kong.

The processes involved are summarised below:

- Establish criteria for selecting tree species for common street typologies in Hong Kong based on the principle of “Right Tree, Right Place” and the life-cycle planning of street trees.
- Shortlist suitable tree species based on the above principles.

³ Environment Bureau, HKSAR Government. (2017). Hong Kong's Climate Action Plan 2030+.

⁴ Environment Bureau, HKSAR Government. (2016). Hong Kong Biodiversity and Strategy Action Plan 2016-2021.

Street Tree Selection Guide

- Recommend suitable tree species and complementary vegetation community mixes (CVCM) for common street typologies to achieve a sustainable, healthy and resilient urban forest and minimise risk of tree failure or premature decline (tree losing vigour before its expected time for its species). CVCM refers to the vegetation underneath the tree canopy, it will be discussed further in **Section 9**.

A set of tree datasheets together with the tree selection criteria rating (**Appendix A-D**) are developed to aid the process of tree selection for Hong Kong streets. It is intended to be a living document with the ability to be updated as more information, data and research is available.

It should be noted that tree species selection should not be restricted to those given in **Appendix A to C** as due to the limitations of this Study, only 80 species were selected as an example. Under the “Right Tree, Right Place” principle, other suitable tree species can be selected using the same methodology proposed in this Guide.

1.3 What is Street Ecology?

“A space of dynamic relationship that results from the complex web of interconnected activities and phenomena...a place that thrives on the co-existence of diverse people, activities, forms and objects and modes of control and negotiation, as it operates as a social, cultural, economic and political space. As a corollary, this also means not thinking the street as a complete and stable state of equilibrium but recognizing the street as a place in flux with some level of conflict.” -- Vikas Mehta ⁵

By definition, street ecology is applying the concept of ecology to the street context. For this Guide, it is the investigation of the relationships and interactions between a street and its immediate environs (carriageway, through-zone, parking spaces, bus stops, surrounding buildings and landscaped area), planting (trees and shrubs) and its users (people and urban wildlife).

1.4 What is Urban Forestry?

Urban forestry is a city wide, integrated, inter-disciplinary approach combining strategic planning and multi-managerial practices to improve the social, environmental and economic benefits to public through a sustainable long-term management of urban vegetation. The term ‘urban’ refers to the dense, built-up areas of the city. As recognized in CAP and Hong Kong 2030+, it is important for different government departments to work together to develop an urban forestry strategy as well as good management practices which are essential to achieve healthy urban forests and enhance Hong Kong’s overall liveability, biodiversity and climate-readiness.

1.5 Benefits of Urban Forest

For this Guide, the main focus will be on street trees. Urban street trees are a major component of a city urban forest. They can provide a range of social, environmental and economic benefits that are often unnoticed and underappreciated. Understanding the benefits of urban street trees aid in making the right decisions in selecting and managing street trees. Possible benefits are summarised in **Figure 1.1**.

⁵ Zavestoski, Stephen and Julian Agyeman. (2015) *Incomplete Streets: Processes, Practices and Possibilities*. s.l. : Routledge.

1.6 Why is Biodiversity Important?

One of the important components to create and maintain a healthy and sustainable urban forest is to maintain biodiversity. Biodiversity is defined as the variety of living organisms in a habitat. A high level of biodiversity is desirable because it boosts ecosystem productivity, sustainability, climate resilience, urban forest benefits and urban forest health. Some species may be better at providing specific urban forest benefits due to intrinsic (morphological and physiological) and temporal (seasonal) characteristics. Thus, to optimise the multiple benefits of the urban forests, it is essential to have vegetation diversity. A broader diversity of urban trees can guard against the risk of large-scale devastation by pests and large-scale replacements due to ageing or environmental changes.

To achieve a resilient urban forest, Dr. Frank Santamour, a Research Geneticist at the US National Arboretum, had recommended in his paper that urban tree planning should follow the 10-20-30 rule for planting diversity. The rule of thumb suggests an urban tree population should include no more than 10% of any one species, 20% of any one genus, and 30% of any family. Following this rule can result in a more biologically diverse planting.⁶

1.7 An Overview of Existing Standards and Guidelines

As mentioned previously, street ecology studies the relationship and interactions between the street environs, planting and its users. In Hong Kong, the existing standards and guidelines related to the spatial consideration requirements for a safe, functional and comfortable street environs are listed below.

Street Tree Planting Spatial Consideration Requirements

- Transport Department, HKSAR Government, *Transport Planning and Design Manual*, 2015.
- Planning Department, HKSAR Government, *Hong Kong Planning Standard and Guidelines*, 2017.
- Civil Engineering and Development Department, HKSAR Government, *General Specification for Civil Engineering Works 2006 Edition Vol. 1, 2 and Guidance Notes*.
- Buildings Department, HKSAR Government, *Guide on Erection & Maintenance of Advertising Signs*.
- Development Bureau, HKSAR Government, *Development Bureau Technical Circular (Works) No.2/2012 – Allocation of Space for Quality Greening on Roads*, 2012.
- Greening, Landscape and Tree Management Section, Development Bureau, HKSAR Government, *Proper Planting Practice - Provide Sufficient Growing Space between Trees and Adjacent Buildings/Structures*, 2011.

Accordingly, planting, maintenance and user requirements can be broadly summarised in the existing standards, guidelines, specification and relevant studies listed below.

⁶ Santamour, F.S., Jr. (1990). Trees for urban planting: diversity uniformity, and common sense. Proceedings of the 7th Conference of the Metropolitan Tree Improvement Alliance, pp.57 – 65.

Landscape Planting and Maintenance Work Requirements

- Civil Engineering and Development Department, HKSAR Government, *General Specification for Civil Engineering Works 2006 Edition Vol. 1, 2 and Guidance Notes*, 2006.
- Greening, Landscape and Tree Management Section, Development Bureau, HKSAR Government, *Guiding Principles on Use of Native Plant Species in Public Works Project*, 2010.
- Development Bureau, HKSAR Government, *Development Bureau Technical Circular (Works) No. 2/2012, Allocation of Space for Quality Greening on Roads*, 2012.
- Development Bureau, HKSAR Government, *Development Bureau Technical Circular (Works) No. 7/2015, Tree Preservation*, 2015.
- Urbis Ltd., *A Comprehensive Street Tree Management Plan for Hong Kong*, 2013.
- Greening, Landscape and Tree Management Section, Development Bureau, HKSAR Government, *Guidelines for Tree Risk Assessment and Management Arrangement*, 2015.
- Greening, Landscape and Tree Management Section, Development Bureau, HKSAR Government, *Handbook on Tree Management*, 2016.
- Agriculture, Fisheries and Conservation Department, HKSAR Government, *Summary of Pesticides Ordinance*, 2014.
- Working Group for Safe and Proper Use of Pesticides, HKSAR Government, *Code of Practice for the Safe and Proper Use of Pesticides in Public Areas*, 2014.
- Agriculture, Fisheries and Conservation Department, HKSAR Government, *Turf and Landscape Management*, 2017.
- Environment Bureau, HKSAR Government, *Hong Kong Biodiversity and Strategy Action Plan 2016-2021.*, 2016.
- Development Bureau, HKSAR Government, *Development Bureau Technical Circular (Works) No. 1/2018, Soft Landscape Provisions for Highway Structures*, 2018.

Based on these existing standards, guidelines and specification, key considerations relevant to roadside tree planting and maintenance works are summarised in **Figure 5-1** and **Figure 5-2**.

BENEFITS OF URBAN FORESTS

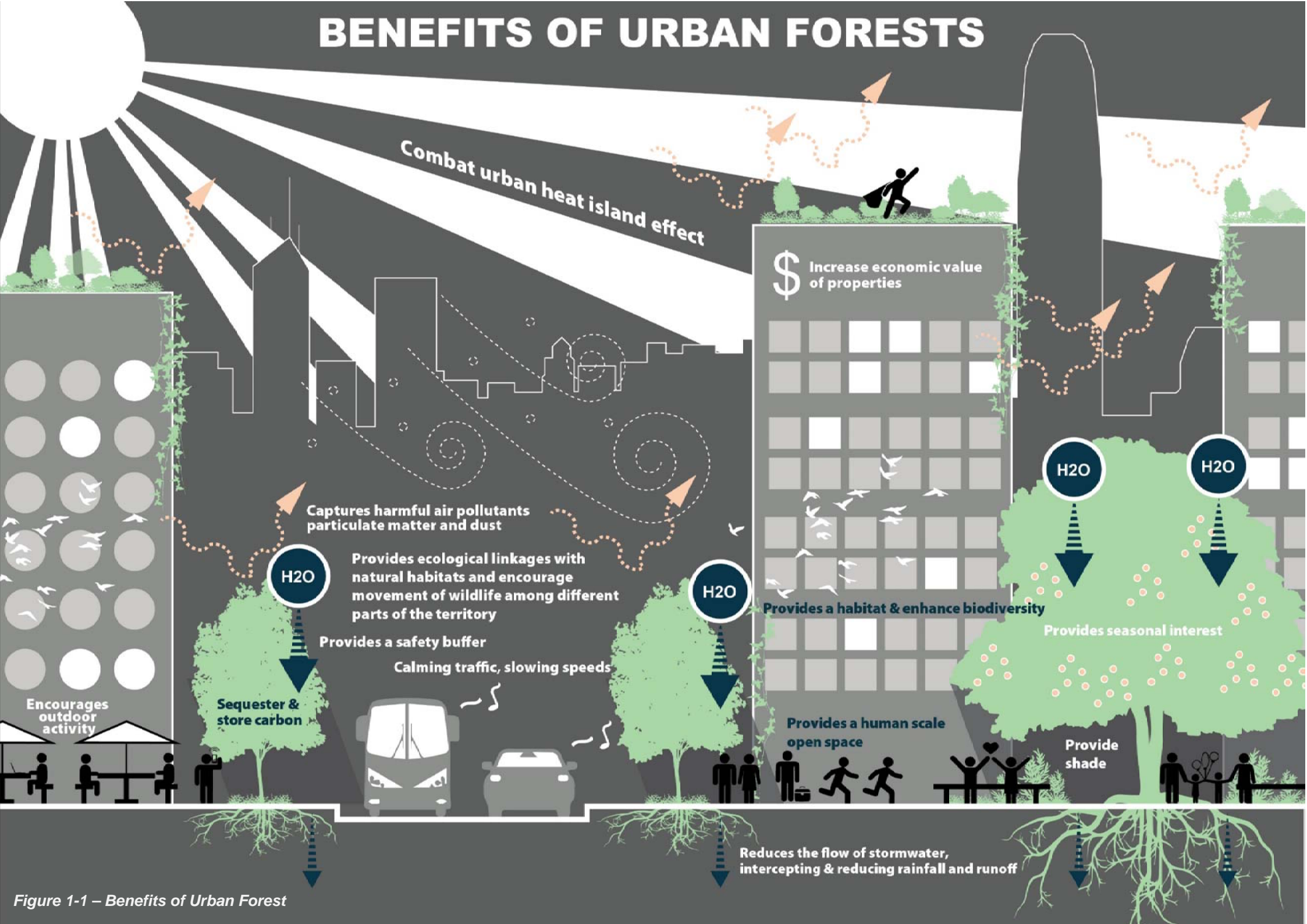


Figure 1-1 – Benefits of Urban Forest