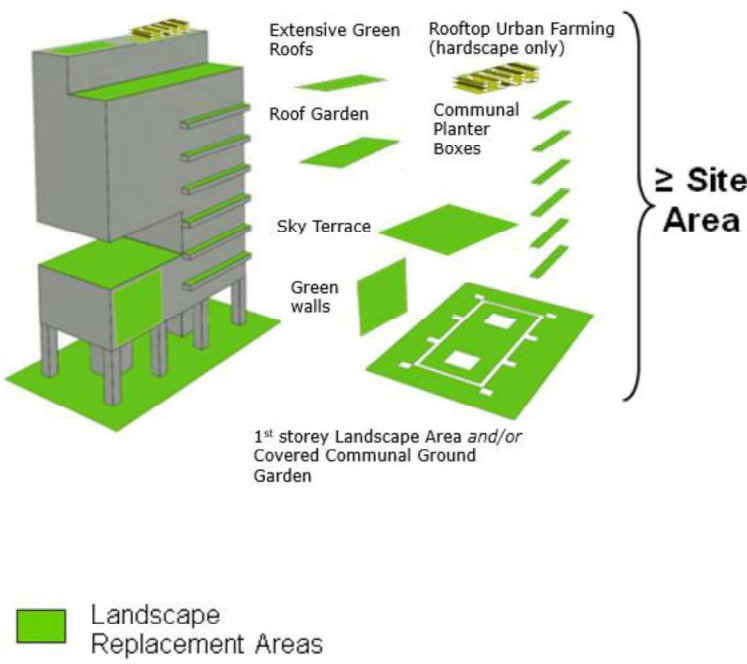


GUIDELINES FOR LANDSCAPE REPLACEMENT AREAS WITHIN NEW DEVELOPMENTS AND REDEVELOPMENTS IN IDENTIFIED STRATEGIC AREAS

	PARAMETER	DETAILS
1	Definition	<p>Landscape Replacement Areas (LRAs) are landscaped areas provided on the first storey or upper levels of the development. The total size of the landscape areas must be minimally equivalent to 100 per cent of the development site area. The diagram below shows the various types of LRAs that could be incorporated within a development.</p>  <p>For developments outside of Central Area with a technical height constraint equal to or below 80m Above Mean Sea Level (AMSL), the required LRA is lower at 70 per cent of the development site area.</p>

2	Computation Requirements	<p>The computation of the LRAs is determined by:</p> <ul style="list-style-type: none"> • Horizontal surface area of the softscape (i.e. permanent planting areas, including extensive green roofs) • Horizontal surface area of the hardscape e.g. communal facilities, urban farm • Vertical surface area of green walls (if any). <p>At least 40% of the development site area, or overall proposed LRAs, whichever is higher, should be for permanent planting, i.e. softscape. The softscape areas provided should also meet the GnPR standard of 4. The remaining provision can be in the form of communal facilities like events plazas, water features and playgrounds, i.e. hardscape.</p> <p>Except for rooftop urban farms, all horizontal landscaped (both softscape and hardscape) areas computed as part of the LRAs within developments have to be:</p> <ol style="list-style-type: none"> a Unenclosed and exposed to the sky; or b If covered, to be open sided, naturally ventilated and qualify for GFA exemption under the prevailing development control guidelines for Communal Planter Boxes, Sky Terraces and Covered Communal Ground Gardens. <p>Rooftop urban farms can count towards up to 10% of the landscape replacement requirement as hardscape areas. Coverings over the urban farms area allowed to protect the crops. The covered urban farm area will be allowed on Temporary Permission, counted as Gross Floor Area and subject to Temporary Development Levy.</p> <p>Vertical greenery and/or extensive green roofs can make up to 10% of the overall Landscape Replacement requirements (as a percentage of site area). They can be counted either as part of the softscape or hardscape components. The 10% for vertical greenery and extensive green roofs is allowed in addition to the 10% allowed for rooftop urban farms.</p> <p>Requests to use vertical greenery and/or extensive green roofs, or rooftop urban farms, for more than 10% of the Landscape Replacement requirements can be considered based on the merits of the proposal.</p>
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3	Green Plot Ratio	<p>GnPR is computed using the following formula:</p> $\text{GnPR} = \frac{\text{Total leaf area of greenery counted as Landscape Replacement (softscape)}}{\text{Total site area of development}}$ <p>All Leaf Area from softscape areas within the development can be counted towards the GnPR computation.</p> <p>Total Leaf Area is computed based on the Leaf Area Index (LAI) for each species, canopy area (for trees and palms) and the quantity planted. The plant species sub-categories and LAI values can be obtained online from NParks' Flora Fauna Web (http://florafaunaweb.nparks.gov.sg) by searching the common or scientific names of plants.</p> <p>Table 1 provides a template for computing the overall development GnPR. This table should be filled in and submitted together with the landscape plans (see Appendix 1-1 for template).</p> <p>Table 1: Green Plot Ratio computation template</p> <table><tr><th colspan="7">DECLARATION OF GREEN PLOT RATIO</th></tr><tr><th rowspan="2">Category</th><th rowspan="2">Unit</th><th rowspan="2">Sub category</th><th>LAI Value</th><th>Canopy Area/m²</th><th>Qty/Planted area</th><th>LEAF Area</th></tr><tr><th>(A)</th><th>(B)</th><th>(C)</th><th>(A)x(B)x(C)</th></tr><tr><td rowspan="4">Trees</td><td>no</td><td>Open Canopy</td><td>2.5</td><td>60</td><td>No.</td><td></td></tr><tr><td>no</td><td>Intermediate Canopy</td><td>3.0</td><td>60</td><td>No.</td><td></td></tr><tr><td>no</td><td>Dense Canopy</td><td>4.0</td><td>60</td><td>No.</td><td></td></tr><tr><td>no</td><td>Intermediate columnar canopy</td><td>3.0</td><td>12</td><td>No.</td><td></td></tr><tr><td>Trees</td><td>m²</td><td>Planted at ≤ 2.0m trunk to trunk</td><td>(as above)</td><td>NA</td><td>m²</td><td></td></tr><tr><td rowspan="2">Palms</td><td>no</td><td>Solitary</td><td>2.5</td><td>20</td><td>No.</td><td></td></tr><tr><td>no</td><td>Cluster</td><td>4.0</td><td>17</td><td>No.</td><td></td></tr><tr><td>Palms</td><td>m²</td><td>Solitary(trunk to trunk ≤2m)</td><td>2.5</td><td>NA</td><td>m²</td><td></td></tr><tr><td rowspan="2">Shrubs</td><td>m²</td><td>Monocot</td><td>3.5</td><td>NA</td><td>m²</td><td></td></tr><tr><td>m²</td><td>Dicot</td><td>4.5</td><td>NA</td><td>m²</td><td></td></tr><tr><td>Turf</td><td>m²</td><td>Turf</td><td>2.0</td><td>NA</td><td>m²</td><td></td></tr><tr><td>Vertical greenery</td><td>m²</td><td></td><td>2.0</td><td>NA</td><td>m²</td><td></td></tr><tr><td colspan="6">(X) Total Leaf Area(m²)</td><td></td></tr><tr><td colspan="6">(Y) Site Area</td><td></td></tr><tr><td colspan="6">(X / Y) Green Plot Ratio</td><td></td></tr></table>	DECLARATION OF GREEN PLOT RATIO							Category	Unit	Sub category	LAI Value	Canopy Area/m ²	Qty/Planted area	LEAF Area	(A)	(B)	(C)	(A)x(B)x(C)	Trees	no	Open Canopy	2.5	60	No.		no	Intermediate Canopy	3.0	60	No.		no	Dense Canopy	4.0	60	No.		no	Intermediate columnar canopy	3.0	12	No.		Trees	m ²	Planted at ≤ 2.0m trunk to trunk	(as above)	NA	m ²		Palms	no	Solitary	2.5	20	No.		no	Cluster	4.0	17	No.		Palms	m ²	Solitary(trunk to trunk ≤2m)	2.5	NA	m ²		Shrubs	m ²	Monocot	3.5	NA	m ²		m ²	Dicot	4.5	NA	m ²		Turf	m ²	Turf	2.0	NA	m ²		Vertical greenery	m ²		2.0	NA	m ²		(X) Total Leaf Area(m ²)							(Y) Site Area							(X / Y) Green Plot Ratio						
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4	Performance Requirements	<p>All LRAs should meet the following performance requirements:</p> <p>a) Designed with safety in mind (e.g. consider wind/structural loading issues associated with upper storey landscape areas) and easily maintained (e.g. with irrigation and maintenance systems); and</p>																																																																																																																						

		<p>b) Well-designed, lushly-landscaped and integrated with the overall form and architectural treatment of the building.</p> <p>Vertical greenery should be publicly visible, e.g. placed at external building facade fronting key pedestrian thoroughfares and/or main roads, and at major public spaces, plazas and main entrance areas. URA may impose additional urban design requirements for vertical greenery for sites in Urban Design areas e.g. Central Area and Key Growth areas.</p> <p>Extensive green roofs should be of a substantial size and have sufficient density of planting, to contribute to green cover and support biodiversity. Such roofs need not be made accessible to the public and/or building users but maintenance access is to be provided for such roofs. Please note that horizontal trellis-based greenery will not qualify as extensive green roofs.</p> <p>Other than the extensive green roofs, the public and/or building users should be able to access all communal landscape areas easily during the normal opening hours of the development¹¹.</p>
5	Softscape Requirements	<p>Planting should be incorporated on permanent and sunken planting beds to enhance the spatial and visual quality of the green spaces. The sunken planting beds should have sufficient soil depth to accommodate plants and landscaping.* Plantings should be appropriately spaced to accommodate growth.</p> <p>Requirements for the horizontal softscape areas:</p> <ul style="list-style-type: none"> a) As a guide, a minimum soil depth of 1000mm should be provided for trees and palms, 500mm for shrubs and climbers, and 300mm for ground covers; b) A combination of trees, palms, shrubs, ground covers and creepers is required; and c) Potted plants will not be counted as part of the softscape area as they can be easily removed. <p><i>*As an alternative to providing sunken planting beds, building owners can provide well-landscaped, low raised planting beds at 300mm high, planted with trees or shrubs (i.e. no turfing allowed). This facilitates compliance with FSSD's fire safety requirements on habitable space.</i></p>

¹¹ For example, the communal landscaped areas in a shopping mall should be open and accessible to the public during the mall's normal operating hours. Similarly, the communal landscaped areas in an office development should be accessible to the larger office community and not limited to users of one specific office premises.

		A Landscape Plan (see Appendix 1-2 for example), including a landscape proposal, relevant plans, cross sections and perspectives, is required as part of the submission.
6	Planting References	<p>To ensure appropriate plant selection and placement, designers are strongly encouraged to decide on planting and landscape design in consultation with an Accredited Landscape Architect or Certified Practising Horticulturalist.</p> <p>The suitability of the vertical greenery and extensive green roof system used (e.g. in terms of weight, growing media, availability of light, resilience to weather elements) should also be taken into consideration.**</p> <p>Please refer to the following publications for more detailed planting references:</p> <ul style="list-style-type: none"> a) 1001 Garden plants in Singapore (2nd edition)(2006), NParks b) CS E09:2012 - Guidelines on planting of trees, palms and tall shrubs on rooftop (2012), NParks c) A Selection of Plants for Green Roofs in Singapore 2nd Edition (2008), NParks d) Trees of our Garden City, 2nd edition (2009), NParks e) Concise Guides to Safe Practices on <u>Rooftop Greenery</u> and <u>Vertical greenery</u> (2013), NParks f) CS E12:2016 - Design Guides To Promote Biodiversity On Roof Gardens (2017), NParks(<i>for biodiversity-friendly inaccessible green roofs</i>) <p><i>**For vertical greenery support systems, planter boxes of minimum 500mm depth are encouraged to be provided at every storey for dense plant growth.</i></p>
7	Hardscape Areas	<p>The remaining LRAs can be considered as hardscape areas provided that the surrounding areas are lushly landscaped. The following elements may be included:</p> <ul style="list-style-type: none"> a Scenic footpaths within the garden area; b Seating; c BBQ pits; d Events plazas; e Water features; f Playgrounds; g Recreational facilities e.g. tennis courts and swimming pools, etc. h Vertical greenery and/or extensive green roofs (up to 10%*) i Rooftop urban farming (up to 10%**)

		<p><i>*Vertical greenery and/or extensive green roofs can be counted towards up to 10% (as a percentage of site area) of the overall landscape replacement requirements, as part of the softscape or hardscape components.</i></p> <p><i>**Prevailing height controls will continue to apply to any urban farm structures and equipment proposed at the roofs. In addition, proposals within Urban Design or Conservation areas will be evaluated according to prevailing design controls.</i></p>
8	Areas to be excluded from Landscape Replacement Areas	<p>The following areas will not be considered as part of the required LRAs:</p> <ul style="list-style-type: none"> a All service facilities, e.g. vehicular drop-offs and drive ways, vehicular ramps, surface car parks, top of M&E or lift core, and BMU tracks, etc; b Vehicular driveway greenery; c Outdoor Refreshment Areas (ORAs); d Key circulation for the building, e.g. access stairs, ramps, and covered walkway, etc.
9	Exemption	<p>The URA will exercise flexibility on the above requirements when evaluating individual developments affected by specific constraints (e.g. developments with conserved buildings, party wall developments, developments subject to specific urban design requirements and developments with storey height constraint of four-storeys and below).</p>
10	Maintenance	<p>Building owners should retain the required LRAs.</p> <p>Consideration should be given to the choice of plant species, relative to the level of sunlight and maintenance required. Irrigation and maintenance systems should be well designed upfront to ensure the safety of the maintenance personnel, and to allow for easy maintenance</p> <p>Please refer to the following for more information :</p> <ul style="list-style-type: none"> - Concise Guides to Safe Practices on Rooftop Greenery and Vertical greenery (2013), NParks - CS E11:2014 - Guidelines on Design for Safety of Skyrise Greenery (2014), NParks - CS E07 : 2012 - Guidelines on General Maintenance for Rooftop Greenery (2012) <p>Building owners should consider adopting water efficient strategies in their design. Please refer to <u>PUB's Water Efficient Building Design Guide Book</u> for more information.</p>
11	Ownership	<p>The LRAs will form part of the common property for strata subdivided developments. LRAs for hotels within mixed-use developments,</p>

		however, may be attributed to the hotel strata should they be contiguous to other hotel uses and be adequately segregated from other uses.
12	Alterations to the required Landscape Replacement Areas	<p>URA's approval is required if there are changes to the softscape areas (e.g. planting and structure of the planting beds) and hardscape areas that result in an overall reduction in area for the required LRAs.</p> <p>URA's approval is not required for changes to the planting species as long as the softscape and Green Plot Ratio requirements are complied with.</p>
13	Submission requirements	<ul style="list-style-type: none"> • Declaration of the overall Landscape Replacement Areas, softscape areas and Green Plot Ratio for the entire development • Overall Green Plot Ratio computation (see Appendix 1-1 for template) • Layout of the softscape and hardscape areas, clearly indicating all items that cannot be counted as Landscape Replacement Area, e.g. structure, key circulation, etc. • Landscape Plans showing the proposed schedule of plant species and paving materials, as well as the layout of plant species at the softscape/ green walls/ green roofs. For vertical greenery/ extensive green roofs, the plans should also show the proposed system • Annotations in the landscape plans to show the proposed planting species and paving materials corresponding to the schedule, and the proposed uses e.g. Swimming Pool, BBQ Area, etc.; • Sections showing the depth of all the proposed planting beds/vertical greenery for Landscape Replacement Areas • Annotation of the 45-degree line, where relevant • Relevant perspectives showing the proposed plant species, as-built outcome and spatial quality • Short statement on the proposed maintenance and irrigation methods for the planting. <p>See Appendix 1-2 for example of landscape plans and information required.</p> <p>Please label and package the landscape plans and sections separately from the rest of the plans. Please also place the softscape and hardscape areas into separate AutoCAD layers in the landscape plan.</p>
14	Clearance process and requirements	URA's Clearance of the completed Landscape Replacement Areas provided by developments within Strategic Areas is required before the Commissioner of Building Control issues the Temporary Occupation Permit (TOP), or Certificate of Statutory Completion (CSC) (when TOP is not required).

	<p>In your submission, please include accurately labelled photographs (in pdf file format) showing the completed Landscape Replacement Areas. URA will evaluate the photographs submitted and, if necessary, arrange for a site inspection before issuing the Clearance for the completed works.</p> <p>Applicants are also required to declare upfront to the Commissioner of Building Control at the point of application for TOP or CSC (when TOP is not required), that URA's Clearance is required for Landscape Replacement Areas before issuance of TOP, or CSC (when TOP is not required).</p>
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APPENDIX 1-1

TEMPLATE FOR OVERALL GREEN PLOT RATIO COMPUTATION

DECLARATION OF GREEN PLOT RATIO						
Category	Unit	Sub-category	LAI Value	Canopy Area/m ²	Qty/Planted area	LEAF Area
			(A)	(B)	(C)	(A)x(B)x(C)
Trees	no	Open Canopy	2.5	60	No.	
	no	Intermediate Canopy	3.0	60	No.	
	no	Dense Canopy	4.0	60	No.	
	no	Intermediate columnar canopy	3.0	12	No.	
Trees	m ²	Planted at ≤ 2.0m trunk to trunk	(as above)	NA	m ²	
Palms	no	Solitary	2.5	20	No.	
	no	Cluster	4.0	17	No.	
Palms	m ²	Solitary(trunk to trunk ≤2m)	2.5	NA	m ²	
Shrubs	m ²	Monocot	3.5	NA	m ²	
	m ²	Dicot	4.5	NA	m ²	
Turf	m ²	Turf	2.0	NA	m ²	
Vertical greenery	m ²		2.0	NA	m ²	
(X) Total Leaf Area (m ²)						
(Y) Site Area						
(X / Y) Green Plot Ratio						

APPENDIX 1-2

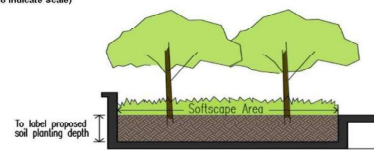
EXAMPLE OF LANDSCAPE PLAN AND INFORMATION REQUIRED



SCHEDULE OF PROPOSED PLANTING SPECIES AND PAVING MATERIALS

LEGEND	DESCRIPTION	PHOTOGRAPH	SUB-CATEGORY	LEAF AREA WEEK (L.A.)	QUANTITY (count or planted area in m ²)	PLANTING DISTANCE (m)	HEIGHT (m) (if applicable)
	Tree - (Name of Proposed Tree Species)						
	Tree - (Name of Proposed Tree Species)						
	Tree - (Name of Proposed Tree Species)						
	Shrub - (Name of Proposed Shrub Species)						
	Shrub - (Name of Proposed Shrub Species)						
	Shrub - (Name of Proposed Shrub Species)						
	Turf Ground Cover - (Name of Proposed Turf Ground Cover Species)						
	Turf Ground Cover - (Name of Proposed Turf Ground Cover Species)						
	(Description of paving materials)						
	(Description of paving materials)						

EXAMPLE OF A SECTION THROUGH A PLANTING BED (SECTION A-A) (To Indicate Scale)



MAINTENANCE & IRRIGATION PROPOSAL FOR THE PERMANENT PLANTING (Insert short statement here)

DECLARATION OF LANDSCAPE REPLACEMENT AREA AND SOFTSCAPE AREA ON THE 5TH STOREY

CALCULATION OF LANDSCAPE REPLACEMENT & SOFTSCAPE AREA FOR 5TH STOREY		AREA (M ²)
Landscape Replacement Area	(Open to the Sky or within 45-degree line) + (Vertical area must meet prevailing sky terrace conditions or additional rainfall (2% to be computed on landscape replacement))	
Softscape Area		

DECLARATION OF OVERALL LANDSCAPE REPLACEMENT AREAS & SOFTSCAPE AREAS (To be shown on site plan)

CALCULATION OF TOTAL LANDSCAPE REPLACEMENT AREA & SOFTSCAPE AREA FOR ENTIRE DEVELOPMENT (this table is to be shown on site plan)		Area (m ²)
Total Landscape Replacement Areas (Softscape + Hardscape area)		≥ Devt. Site area
Total Softscape Area		≥ 40% of Devt. Site Area
Green Plot Ratio		≥ 4