

**Chew, M.Y.L.; Conejos, S. and Azril, F.H.B. (2018) Design for maintainability of high-rise vertical green facades. *Building Research & Information.***

**Supplemental data**

**Appendix 1**

**Green maintainability design considerations for tropical green walls**

	<b>Design Criteria</b>	<b>Design Parameter</b>	<b>Indicator</b>
<b>Technical</b>	Maintenance and construction methods considerations	Life cycle cost	Cost considerations for the entire lifespan of whole building
		Maintenance access	Height and span; system to be used; configuration
		Façade Treatment	Frequency of maintenance, cleaning and repairs
		Safety measures	Safety measures during construction, installation and maintenance
		Proper construction and installation methods	Based on the type of construction and installation methods/ applications
	Design and climatic considerations	Plant suitability and sustainability	Based on sun exposure, shading and water needs (e.g. full sun, full shade, semi-shade, needs little water, needs moderate water and needs abundant water
		Availability of natural elements	Based on climate classification, temperature, rainfall intensity, wind direction, sun's path and soil type, water and lighting availability.
	Water and irrigation systems	Energy efficiency	Energy consumption and savings
		Water efficiency	Water consumption and savings
	Drainage and waterproofing systems	Drainage system	Based on proper gradient, pipe systems and drainage methods and water drip tray provisions.
Waterproofing system		Based on type of waterproofing used and methods of application, pipe penetration considerations.	
Structural stability and material durability	Green wall systems	Based on height, loading capacity, type of material and structural components to be used, lifespan and replaceability	
	Green wall type	Based on exterior or interior applications	
<b>Environmental</b>	Biological growth	Algae growth control	Water stagnation, shade and moisture considerations
		Root growth control	Plant and substrate considerations, type of planter to be used
		Pest control	Type of fertilizer and insecticides to be used
	Animal control	Bird nesting control	Type of barrier to be used

Adapted from Chew and Conejos (2016) and improved by the authors

## Appendix 2

### Normative standards referred in the DfM guidelines

- ASME A120.1-2014 - Safety Requirements for Powered Platforms and Travelling Ladders and Gantries for Building Maintenance
- BS 4428:1989 - Code of practice for general landscape operations (excluding hard surfaces)
- BS 7370-5:1998 - Grounds maintenance. Recommendations for the maintenance of water areas
- BS 8221-1:2012 - Code of practice for cleaning and surface repair of buildings. Cleaning of natural stone, brick, terracotta and concrete
- BS EN 363:2008 - Personal fall protection equipment. Personal fall protection systems
- SS 509-1:2015 - Code of practice for cleaning and surface repair of buildings - Part 1: Cleaning of natural stone, brick, terracotta, concrete and rendered finishes
- SS CP 14:1996 - Code of practice for scaffolds

Note: The guidelines referred below can be applicable in ensuring safety during the installation of high-rise VGS:

- BS 6150:2006+ A1: 2014 - Painting of buildings. Code of practice
- SS 542:2008 - Code of Practice for the Painting of Buildings