



Vertical greenery is not a new concept; it dates back thousands of years. Basic green walls have come in the form of espaliered trees, creepers and vines; it's standard gardening practice.

Modern green walls come in a huge range of shapes, sizes and designs, adding modern technology and materials to age-old gardening methods.

There are many terms used to describe the new take on vertical gardening, with phrases like vertical garden, wall garden, green wall, living wall and green facade often used interchangeably.

**BENEFITS CAN INCLUDE:**

- Improved air quality.
- Filtered water runoff.
- Food production, herbs and vegetables etc.
- Making walled spaces more attractive.
- The look and feel of a lush garden in a small space.
- The creation of a modern, contemporary look.
- Thermal insulation of walls.
- Food and shelter for animals (yes, insects too).
- A reduction in local wind speeds and noise levels (large vertical gardens).
- Improved physical and mental health and well-being.
- A potential increase in property value.
- Some degree of fire resistance.

**CONSIDER:**

- Available space.
- An inside or outside garden.

- Garden style (succulents, floral, ferny etc).
- Access to garden for ongoing maintenance.
- The amount of time you have to maintain your garden.
- The proposed location of your garden and its aspect, assess:
  - Sunlight.
  - Temperature.
  - Exposure to wind and frost etc.
- Seasonal changes including:
  - Variations in temperature, levels of sunlight etc.
  - Changes to the plants themselves such as flowers, the colour of new growth, die back, deciduous behaviours etc.
- That a reasonably large and healthy green wall will create a micro-climate - you may end up with lizards and spiders but they will eat pests like mosquitoes.
- How far your plants will grow up and how far they will protrude out from the wall.
- That existing cold, dark sites will become cooler and darker.
- That you can make hot, exposed locations less extreme, but it will take some planning and work.
- That some plants that should grow in particular conditions won't, while those that should not, do. Apparently plants don't read gardening books. Experiment.
- Duration – will this feature be a permanent installation or something that needs to be moved?
- How long it will take for the plants to fill out your garden.
- Starting with fast-growing plants for an instant effect while slower-growing varieties become established.
- The need for permission from council, strata etc.

## THE PLAN

If your planned garden is smaller than the wall it will be installed on, or something other than a simple geometric shape, make a basic cardboard mock-up of your design, hang it in the chosen location and then make any necessary adjustments.

### YOU SHOULD ALSO:

- Ensure the size of your garden is in proportion with its location.
- Ensure the design complements the surroundings.
- Determine the type of support structure.
- Determine your design style, will it be geometric or organic etc?
- Decide on the level of complexity - lots of different plants/single species.
- Incorporate other garden elements such as sculptures and water features.

## TECHNICAL

### FOR THE STRUCTURE AND ITS SUPPORT, YOU WILL NEED:

- Something to hold the soil/growing medium or matting in a vertical layout.
- A method of holding the soil in place when the garden is vertical and also when watered.
- A way of fixing the structure to the wall.
- A support that will bear the weight of the garden when fully planted and with the added weight of water in the growing medium.

### THERE ARE A RANGE OF BASIC STRUCTURAL SUPPORT SYSTEMS:

- Plants can grow from ground level and climb directly on the wall.
- Framework can be fixed to wall onto which plants climb.
- Standard types of pots sitting in a framework or hung on the wall.
- Pre-made structures and modular components fixed to walls into which plants are "plugged" and grow out of a completely vertical surface.

- Modular panels with mats of growing medium where a horizontal slash in the matting creates pockets of horizontal growing medium from which plants grow.

### WHERE TO START

- Either decide on plants first, then select the support structure suited to those plants or decide on a preferred structure then select plants to suit it.

### CONSIDER:

- Drainage - water draining out of your garden may stain the wall below it. Use an old chain or rope to lead excess water to the ground, rather than allowing it to run down the wall.
- Runoff - excess water will need to be managed so it does not pool below your garden and cause damage.
- Materials - Wet timber rots and wet metals can corrode. Plastics are fairly hard wearing and require little to no treatment.

## GROWTH MEDIA

Most media will need replacing/topping up eventually, consider this as a part of maintenance requirements. Types include:

- Loose
  - Standard potting mix.
  - Light weight soil.
  - Inorganic growing medium.
- Matt
  - Coir fibre or felt mats.
- Structural
  - Growth medium blocks with features of both loose and matt media.

## WATER AND FERTILISER

- Vertical gardens dry out faster than pot plants.
- The top of a unit will dry out faster than the bottom.
- Depending on conditions, you may need to water daily or install an automated hydroponic or drip irrigation system.
- Use microbe-rich fertilisers and spray with leaf-absorbed nutrients.

## PLANT SELECTION

- The best plants for vertical gardens are small, dense, compact and low growing.
- Ground-hugging plants with short stems are a safe option too.
- Epiphytes are ideal for vertical gardens. They are plants that grow, non-parasitically, on other plants and non-organic structures. They derive moisture and nutrients from the air and rain and from debris that accumulates around them.

### EPIPHYTES TO EXPERIMENT WITH INCLUDE CERTAIN TYPES OF:

- Mosses.
- Ferns.
- Cacti.
- Orchids.
- Bromeliads.

### CONSIDER:

- Exposure and outlook.
- Leaf size, shape and texture.
- Leaf colour and pattern.
- The presence of flowers / berries etc.
- Depth and rate of root growth and size of root ball.
- Plant height.
- Annuals or perennials.
- Water requirements.
- Fertiliser.
- Maintenance demands.
- Growth habits (which varieties could overrun your space).
- Resistance to pests and disease.
- Thorns and toxicity to children and pets.
- Soil depth in your garden structure.
- Your space - is it best suited to plants that climb up or those that cascade down?

## WARNINGS

- It is essential to avoid all plants classified as weeds in your area. You may still find some of them in your local nursery; check with council/government websites.
- When growing plants that will climb on a wall with no supporting structure, such as types of ivy and fig, be aware that they will cause serious damage to walls if they can grow into cracks and crevices, between fence palings or into soft mortar between bricks. If they can't penetrate the surface of the structure, you should be OK.

## POSITIONING PLANTS

Plants can be arranged in all sorts of designs like a chequerboard pattern for example, make use of different leaf shape, colour and texture.

Vertical garden units can be planted out in a horizontal position, to let the plants take root, then lifted into a vertical position (where applicable).

There are some basic rules when it comes to positioning.

### CONSIDER:

- Plants with a spreading habit, will work better at the bottom of your garden. They will produce a cascading effect.
- Long leaves or bushy growth will stop light getting to plants below them. Put these plants lower on the wall to maximise sunlight to the whole garden.
- Position protruding plants above shade-loving varieties in exposed locations where the shade-lovers would not normally survive.
- Plants that can cope best with drying out should be at the top of your garden.
- Varieties that prefer damp/wet conditions are best placed at the bottom of your garden.

## PLANT SPECIES SUGGESTED

### BRIGHT-LIGHT LOVING

- Succulents of all sorts including:
  - Echeverias
  - Euphorbia polychroma
  - Sempervivums (should survive in frosty areas)

### NATIVES

- Dianella – Little Jess
- Dianella – Tas Red
- Ruby Saltbush
- Lomandra Seascape
- Gaura – Lollipop Pink
- Santolina
- Society garlic
- Mini mondo grass.

### TYPES OF FRUIT AND VEGETABLES INCLUDE:

- Lettuce (loose leaf variety rather than head)
- Rocket
- Cucumber
- Tomatoes
- Capsicums
- Strawberries
- Chillies

### HERBS INCLUDE:

- Basil (dark opal, green etc)
- Sage
- Thyme (variegated)
- Chervil
- Oregano
- Chives
- Marjoram (golden)
- Rosemary
- Coriander
- Parsley
- Mint

### ORNAMENTALS INCLUDE:

- Nandina Domestica
- Chinese Star Jasmine
- Mandevilla
- Golden Diosmas
- Cerastium
- Cuphea
- Mondo Grass
- Climbing Roses
- Miniature Roses
- Petunias
- Nasturtiums
- Wisteria
- Daisies
- Ferns
- Bromeliads
- Orchids
- Alyssums
- Violets
- Korean Box
- Sedums
- Mosses
- Lichens
- Grasses

### SHADE-LOVING PLANTS INCLUDE:

- Plectranthus
- Maidenhairs
- Arthropodiums
- Clivias
- Dianellas
- Liriopes
- Miniature umbrella trees
- Metrosideros

### INDOOR VARIETIES

Make the most of species with the best ability to absorb volatile organic chemicals (VOCs).

#### **A University of Technology**

**Sydney study** found plants that do a good job of removing VOCs from air indoors include:

- Aglaonema modestum (Chinese evergreen)
- Chamaedorea elegans (Bella Palm or Parlour Palm)

- Dracaena deremensis (Cornstalk Dracaena 'Janet Craig')
- Dracaena marginate (Pleomele or the Song of India)
- Epipremnum aureum (Australian Native Monstera, Centipede tongavine, Devil's Ivy, Golden Pothos, Hunter's robe, Ivy arum, Money Plant, Pothos, Silver Vine, Solomon Islands' Ivy and Taro vine)
- Howea forsteriana (Kentia palm)
- Philodendron (Congo was the species tested)
- Sansevieria trifasciata (Mother-in-law's tongue)
- Schefflera (Umbrella Tree – Amate was the species tested)
- Spathiphyllum (Peace Lily – Petite and Sweet Chico were tested)
- Spathiphyllum (Sensation was the species tested)
- Zamioculcas zamiifolia (Zanzibar Gem)

**Note:** VOC removal depends on a healthy root system.

#### INDOOR SPECIES INCLUDE:

- Kentia palm
- Peace lily
- Mother-in-law's tongue
- Zanzibar
- Happy plant

#### OTHER SUGGESTED OUTDOOR SPECIES INCLUDE:

- Adiantum sp. – Spleenwort (native)
- Asplenium oblongifolium – Shining Spleenwort
- Blechnum nudum – Fishbone Waterfern (native)
- Crytomium sp. – Holly Fern
- Davallia pyxidata – Hare's Foot Fern (native)
- Dichondra repens – Kidney Weed, Emerald Falls (native)
- Doodia aspera – Prickly Rasp Fern (native)

- Liriope - Lilyturf – Evergreen Giant
- Peperomia sp. – Ripple Plant
- Polypodium – Rock Polypody, Blue Star
- Aglaonema Maria
- Alocasia Polly
- Calathea Rufibarba
- Fern Birdnest
- Fern Rabbit's Foot
- Ficus Decora
- Maranta Red
- Pothos Green Jade
- Schefflera Arboricola Green
- Spathiphyllum Dario
- Spider Plant
- Syngonium White
- Pteris alboliniata – Brake Fern
- Pteris umbrosa – Jungle Brake (native)
- Selaginella sp. – Spikemoss
- Soleirolia soleirolii – Baby Tears
- Streptocarpus caulescens – Nodding Violet
- Tradescantia – Spiderwort
- Viola hederacea – Native Violet (native)

#### PLANTS THAT PERFORMED WELL IN AN AUSTRALIAN GOVERNMENT STUDY INCLUDED:

- Bulbine vagans (Bulbine Lily)
- Calandrinia remota (Round Leaf Parakeelya)
- Dianella tasmanica (Tasman Flax Lily)
- Plectranthus argentatus (Silver Plectranthus)
- Plectranthus parviflorus (Cockspur Flower)

#### Study: living wall and green roof plants for Australia

#### SAFETY

It is essential that you consider the impact of installing a green wall on your home and its surroundings.

- Get all permissions/approvals necessary.
- Consider all technical aspects such as the weight of your garden and the structure that will support it.

Potting mix should be handled with care. Use gloves, wear a dust mask and follow manufacturer instructions.

This information is general in nature and covers just a small amount of the information you will need to complete your specific project.

Consult the relevant experts to get specific advice about your plans, and follow all manufacturer instructions.

Your list of requirements will vary according to what you start with and what you're planning to do.

DIY can be a very dangerous business. Be careful, read and follow all instructions provided with the tools and materials you're working with.

Don't take shortcuts, use and wear all appropriate safety equipment. Be very careful with older homes that may contain harmful substances like lead paint and asbestos.

All the safety information essential for safe DIY is out there, read up and stay safe.

Photo credit: The vertical gardens in the Clara development in South Yarra, Melbourne, by Elenberg Fraser.